

Measurement of service innovation project success

A practical tool and theoretical implications

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Design thinking and effectuation in internal corporate venturing: an exploratory study

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This study examines design thinking and effectuation in internal corporate venturing. By researching five internal corporate venturing projects in their early stage from idea to concept to a project that is funded and staffed, we reveal elements of effectuation and design thinking from the viewpoint of the corporate entrepreneur. We find that corporate entrepreneurs work mainly following an effectuation logic, especially through their own means, while elements of prediction are imposed through decision gates in the case company. Furthermore, we find connections to design thinking. We conceptually compare design thinking and effectuation and contribute to the body of knowledge through bridging design thinking and effectuation to internal corporate venturing as well as the connection of design thinking and effectuation.

1 Introduction

Design thinking and effectuation are two concepts related to innovation that recently gained attention of both practitioners and academics. Design thinking is a methodology that “imbues the full spectrum of innovation activities with a human-centered design ethos” (Brown 2008, p.86). In today's economy, change is becoming increasingly important as well as knowledge becomes more significant (Toivonen & Tammela 2013) and business is becoming more entrepreneurial (Sarasvathy 2001). This external change demands also for internal change in established corporations (Kuratko et al. 2011), leading towards a focus on innovation. Corporate entrepreneurship in form of internal corporate venturing is one way to achieve innovation (Guth & Ginsberg 1990). In order to successfully innovate through corporate entrepreneurship, it is necessary to offer the right environment (Ireland et al. 2009) and thus know how corporate entrepreneurs work. Sarasvathy's (2001) logic of effectuation aims to explain the expertise of expert entrepreneurs. Design thinking and effectuation share the same origins rooted in Herbert Simon's (1969) groundbreaking work “The Sciences of the Artificial” (for design thinking see Johansson-Sköldberg et al. 2013; for effectuation see Sarasvathy 2008). There have been recent attempts to compare effectuation to creative approaches such as bricolage (Fisher 2012; Archer et al. 2009). Despite shared origins, effectuation and design thinking have not been compared.

There have been recent attempts to bridge design thinking to corporate entrepreneurship (Abrell & Uebernickel 2014) as well as user involvement in internal corporate venturing (Abrell & Durstewitz 2014). The logic of effectuation has been recently extended to the corporate context through researching effectuation in corporate R&D projects (Brettel et al. 2012) as well as theoretically addressed (Svensrud & Åsvoll 2012; Duening et al. 2012). Nevertheless, design thinking and effectuation have not been researched together in the corporate context.

We utilise a framework from Hassi & Laakso's (2011) literature review of design thinking in the management discourse and conceptually compare design thinking and effectuation. On the basis of this comparison, we research five internal corporate venturing projects from the viewpoint of the corporate entrepreneur in their early stage from idea to a concept until a project which is funded and staffed. We discuss our findings in light of the initial research model and conclude with managerial implications.

2 Background and Conceptual Model

2.1 Design Thinking

Design thinking has been discussed in the design discourse already since Simon's ground-breaking work “The sciences of the artificial” (Simon 1969). Since then, the discourse evolved from the creation of artefacts towards design thinking as reflexive practice, problem-solving activity, a practice-based activity towards the design as creation of meaning (Johansson-Sköldberg et al. 2013). In the managerial literature, design thinking has gained momentum as an approach to innovation (Hassi & Laakso 2011), reflected in a steep increase in the number of publications from year 2000 onwards (Johansson-Sköldberg et al. 2013). Brown (2008, p.86) describes design thinking as “a methodology that imbues the full spectrum of innovation activities with a human-centered design ethos”, with particular emphasis on “thorough understanding, through direct observation, of what people want and need in their lives and what they like or dislike about the way particular products are made, packaged, marketed, sold, and supported”. Besides product innovation, design thinking has been particularly interesting for service innovation (Stickdorn 2010).

Hassi & Laakso (2011) conceptualise design thinking in the management discourse as a combination of practices, thinking styles and mentality aspects. The ‘practices’ encompass a human-centred approach, thinking by doing, visualising, combination of convergent and divergent approaches as well as collaborative work style (Hassi & Laakso

2011). The ‘thinking styles’ category includes abductive reasoning, reflective reframing, a holistic view as well as integrative thinking (Hassi & Laakso 2011). The ‘mentality’ component includes experimental and explorative, ambiguity tolerant, optimistic and future oriented (Hassi & Laakso 2011). The level of analysis is the individual applying design thinking.

2.2 Effectuation

The concept of effectuation has been introduced by Sarasvathy (2001) as a theory explaining entrepreneurial decision-making under uncertainty. She contrasts effectuation with causation, where a certain effect is given and means are selected to achieve this effect (Sarasvathy 2001). Effectuation is described as the logic of entrepreneurial expertise with logic defined as a “consistent set of ideas that forms a clear basis for action upon the world” (Sarasvathy 2008, p.17). Sarasvathy (2001) initially proposed four principles that have been further developed in her subsequent work into five principles of entrepreneurial expertise (Sarasvathy 2008):

1. means-driven in contrast to goal-driven action: to create something new with existing means rather than to select between different means to achieve a given goal;
2. affordable loss: decision-making based on what one is willing to lose in an experiment opposed to calculating expected returns;
3. stakeholder involvement based on pre-commitments to the project to form strategic alliances;
4. exploitation of contingencies through embracing opportunities that develop over time;
5. controlling an unpredictable future: effectuation focuses on the controllable aspects of an unpredictable future, meaning that the entrepreneur him- / herself is the prime driver of opportunity.

2.3 Conceptual model of design thinking and effectuation

The concepts of design thinking and effectuation have a shared origin in Herbert Simon’s *The Sciences of the Artificial* (1969). Effectuators see both firms and markets as human-made artifacts, thus effectual entrepreneurship may be seen as a science of the artificial (Sarasvathy 2008). Design thinking is discussed in the designerly and management context (Johansson-Sköldberg et al. 2013). Johansson-Sköldberg et al. (2013) see the sciences of the artificial as the first of five discourses in the designerly context. However, the concept of design thinking departed since then to the reflection on actions of designers, solving wicked problems, designer’s practice and the creation of meanings (Johansson-Sköldberg et al. 2013). Nevertheless, there may be more similarities between the two concepts.

Hassi & Laakso (2011) distinguish in the management context between practices, thinking styles and mentality. Their model as shown in Table 1 is the base for our conceptual model of design thinking and effectuation. The collaborative work style category corresponds to involving stakeholders in effectuation – who I know in the means category as well as stakeholder involvement. Combination of divergent and convergent approaches may be compared to exploitation of contingencies. Thinking by doing may be compared to experimentation and affordable loss. Effectuation may be the logic behind applying different practices of design thinking. An experimental and explorative approach in design thinking is also comparable to effectuation (Hassi & Laakso 2011; Sarasvathy 2001). Tolerance for ambiguity is necessary in order to deal with uncertain future – one approach is to do small experiments. Optimism and future orientation cannot be directly translated, although belonging to the effectuator. While means are abstract, practices may be the concrete application of means.

Sarasvathy’s definition of logic as “consistent set of ideas that forms a clear basis for action upon the world” (Sarasvathy 2008, p.17) may be comparable with Hassi & Laakso’s thinking styles.

Our conceptual model is based on Hassi & Laakso’s (2011) categorisation of design thinking. For each element delineated by them we looked for insights from effectuation.

Table 1. Elements of Design Thinking (Hassi & Laakso 2011) and Effectuation.

Practices		Thinking Styles		Mentality	
Design Thinking	Effectuation	Design Thinking	Effectuation	Design Thinking	Effectuation
Human-centred approach e.g. people-based, user-centred, ethnography, observation	Means-driven (Sarasvathy 2008) in connection with user involvement (Abrell & Durstewitz 2014) importance of external stakeholders (Toivonen & Tammela 2013) customer-involvement (Brettel et al. 2012)	Abductive reasoning e.g. the logic of „what could be“, finding new opportunities, urge to create something new, challenge the norm	Creation of opportunities through abductive processes (Sarasvathy et al. 2010)	Experimental & explorative e.g. the license to explore possibilities, risking failure, failing fast	Affordable loss (Sarasvathy 2008) Experimentation and means (Chandler et al. 2011; Brettel et al. 2012)

Practices		Thinking Styles		Mentality	
Thinking by doing e.g. early and fast prototyping, fast learning, rapid iterative development cycles	Controlling an unpredictable future (Sarasvathy 2008)	Reflective reframing e.g. rephrasing the problem, going beyond what is obvious to see what lies behind the problem, challenge the given problem	Exploitation of contingencies (Sarasvathy 2008)	Ambiguity tolerant e.g. allowing for ambiguity, tolerance for ambiguity, comfortable with ambiguity, liquid and open process	Expert entrepreneur knows that pursuing opportunity is a process with an unknown end (Wiltbank et al. 2006) Exploitation of contingencies (Sarasvathy 2008) Effectuation way to manage under uncertainty and high ambiguity (Brettel et al. 2012; Duening et al. 2012)
Visualising e.g. visual approach, visualising intangibles, visual thinking		Holistic view e.g. systems thinking, 360 degree view on the issue		Optimistic e.g. viewing constraints as positive, optimism attitude, enjoying problem solving	
Combination of divergent and convergent approaches e.g. ideation, pattern finding, creating multiple alternatives	Experimentation (Chandler et al. 2011)	Integrative thinking e.g. harmonious balance, creative resolution of tension, finding balance between validity and reliability		Future-oriented e.g. orientation towards the future, vision vs. status quo, intuition as driving force	Importance of tacit knowledge and gut feeling in effectuation (Svensrud & Åsvoll 2012)
Collaborative work style e.g. multidisciplinary collab. involving many stakeholders, interdisc. teams	Stakeholder-involvement based on precommitments (Sarasvathy 2008)				

In terms of practices, the importance of external stakeholders and user-based innovation (Toivonen & Tammela 2013) is highlighted as well as partnerships and customer-involvement (Brettel et al. 2012). Also Sarasvathy's (2008) concept of means can be mentioned as Abrell & Durstewitz (2014) found that the means of corporate entrepreneurs are a crucial factor whether users are involved or not. Nevertheless, one main difference between effectuation and design thinking may be in the human-centred approach. Despite the connections outlined here, the concept of effectuation can be characterised more as entrepreneur-centred (Sarasvathy 2001) rather than human-centred.

Thinking by doing may be connected to controlling an unpredictable future (Sarasvathy 2008), as the entrepreneur acts according to his / her set of means to achieve fast learning and iterative development cycles. A combination of divergent and convergent approaches can be described as experimentation (Chandler et al. 2011). In terms of collaborative work style, stakeholder involvement based on pre-commitments (Sarasvathy 2008) can be seen comparable to design thinking.

In the thinking styles category, abductive reasoning can be compared to the creation of opportunities through abductive processes (Sarasvathy et al. 2010), while reflective reframing points towards exploitation of contingencies (Sarasvathy 2008), as the problem may be rephrased when embracing opportunities that develop over time.

In the mentality category, the item experimental and explorative corresponds to Sarasvathy's (2008) principle of affordable loss, which is based on deciding how much one is willing to lose in order to gain new insights. Also the concept of means is mentioned by Chandler et al. (2011) and Brettel et al. (2012). The latter point out, that means alone may not be influential, but how they are enacted in an experimental manner (Brettel et al. 2012).

In terms of ambiguity tolerance, it is mentioned that expert entrepreneurs know that pursuing an opportunity is a process with an unknown end (Wiltbank et al. 2006), pointing towards the exploitation of contingencies (Sarasvathy 2008). Effectuation is seen as a way to manage under uncertainty and high ambiguity (Sarasvathy 2001; Brettel et al. 2012; Duening et al. 2012).

Lastly, effectuation is future-oriented, as the importance of tacit knowledge and gut feeling has been outlined (Svensrud & Åsvoll 2012), corresponding to the importance of intuition as driving force (Hassi & Laakso 2011).

3 Methodology

To study effectuation and design thinking in internal corporate venturing, we conducted a single case study with embedded sub-cases (Yin 2003). Sarasvathy (2001) call for studies examining particular decisions in particular

functional areas inside firms using case studies. Case studies take into account the context in which phenomena occur (Eisenhardt & Graebner 2007) and are specially suitable when the boundaries of phenomena and context are not clearly drawn (Yin 2003), as it can be observed in corporate entrepreneurship (Kuratko et al. 2011).

Despite the limitations of a single case study design, we chose this design due to the unique access we got for this study, i.e. a revelatory case (Yin 2003) as well as that we aim on getting the viewpoint of the corporate entrepreneur in different stages of internal corporate venturing. The research setting provides us with a shared context to be able to draw conclusions for the early stage of internal corporate venturing projects.

The corporation in which the study took place employs over 50.000 people and offers high-tech investment goods in a business-to-business environment. We got the unique access to join the corporation's support structure for internal corporate venturing for four months in 2013 to conduct the study.

The sub-cases (called sub-case A-E) were chosen due to theoretical sampling based on the current stage the internal corporate venturing project is currently in. We focused on a early stage and derived a classification from Burgelman's (1980) stage model of internal corporate venturing with the categories idea, concept and project and intermediary stages from idea to concept, as well as concept to project.

Table 2. Overview of the cases.

Sub-case	A	B	C	D	E
Stage	Idea to concept	Concept to project	Concept to project	Project	In service (after project stage)
Data collection method	Interview, document analysis, design-probe, co-creation workshop with lead entrepreneur	Interview, document analysis, design-probe, co-creation workshop with lead entrepreneur	Interview, document analysis, co-creation workshop with lead entrepreneur	Interview, design probe, co-creation workshop with lead entrepreneur	Interview, co-creation workshop with entire team

To triangulate our findings, we used four data collection methods: interviews, document analysis, design probes and co-creation workshops. To immerse into the context and gain information on the sub-cases from the perspective of the support structure we conducted ten exploratory expert interviews. In each sub-case, we conducted a semi-structured interview with the lead entrepreneur, lasting from 90 to 240 minutes to grasp the nature and development of the project. In each interview, we asked a set of specific questions to reveal the lead entrepreneurs logic in terms of effectuation and causation. Due to confidentiality reasons, audio recording of the interviews were not possible, therefore we relied on written notes of the interviews and processed them into a structured documentation after each interview.

In addition, we were able to study documents of the sub-cases A-C. We conducted in total three daylong co-creation workshops with similar structure, but changing participants. Before the first workshop was conducted, we did a pilot workshop with students to iterate the tasks. The workshops followed the Lego Serious Play method (LEGO Group 2010) to reveal tacit assumptions of workshop participants through building with Lego bricks and giving them meaning and sharing it with other workshop participants. During each workshop, one moderator as well as one documenting person was present. Both the moderator as well as documenter took structured notes that were supported by rich visual material such as the Lego models and pictures.

Table 3. Participants of the co-creation workshops.

Workshop	Participants
Workshop 1	Five experts from support structure
Workshop 2	Lead entrepreneurs sub-case B and D, one expert support structure
Workshop 3	Lead entrepreneurs sub-case A, C, E, one expert support structure involved in sub-case E, additional entrepreneur sub-case E

Lastly, design probes were given to three lead entrepreneurs to document one week as corporate entrepreneur. Design probes are a method to explore human-centred phenomena and the context of a person (Mattelmäki 2006). Of the three design probes, two probes were returned and taken into account.

We addressed internal validity through a continuous analysis of our data during the data collection (Eisenhardt 1989). We conducted first a within-case analysis of each sub-case, and subsequently compared the findings to identify patterns.

4 Findings

The findings outlined in Table 4 are a combination of the in-depth interviews, co-creation workshops, design probes and document analysis. We centred our questions around the elements that have shown a connection between design thinking and effectuation.

Table 4. Case study findings.

Sub-case Question	A	B	C	D	E
Was your starting point a vision, which you wanted to achieve through own skills or a concrete goal?	Concrete goal, but solution emerged	Vision (starting with a problem and an open end)	Vision ("it happened like this"), building on another idea and taking the principle and applying it to another context	Vision	Concrete goal
How did you conduct activities?					
linear or iterative?	Iterative	Iterative	More linear (one iteration to bring the new idea to the new application)	Strongly iterative	Iterative, used design thinking, agility and sprints
based on your own means?	Yes, learned new skills on the way	Never asked him-/herself the question, just started	Completely, yes	Means-driven (powerpoint-prototype for example)	Yes
through small experiments based on affordable loss? (opposed to expected returns)	Tried various versions, small experiments	Not expected return	Small experiments, prototypes, low-tech, did not acquire any funding (only time invested)	Affordable loss – experiment to share IPR with expert in order to get idea into implementation	(no answer)
Did you ask yourself "What can I do? Who do I know, which resources can I get?"	(no answer)	"Never doubting", "never reflected if (he/ she) can bring it to end"	(no answer)	Yes	Team member had the skills, was interested, learning, personal time and was able to make a prototype and pitch it to top management
Did people enter the project self-selected?	No, only the support structure showed interest (and his/ her manager)	People interested, but nobody entered the project	One person who first had a competing concept – they gave each other mutual feedback, later worked closer together	No, but hoped for it	Yes
Did the outcomes of the project reshape?	Yes, slightly, but main idea stayed the same	Yes, a lot, and in completely different directions	Yes, the concept got refined and the first idea changed to the second	Yes, strongly because of customer experience	Re-shaped only in details
Did you seek partnerships?	No, worked alone and got feedback from manager	At the beginning yes, but then disappointed	Yes, sought partnership with one fellow corporate entrepreneur	Protection because of bad experiences, but now tries again to seek partnerships	No partnerships
How did you deal with unexpected situations? Did you use uncertainty as a source of opportunity or did you try to avoid it and quickly overcome the situation?	When dealing with unexpected situations take the time to get distance and then work on it	Acknowledged and source of opportunities	(no answer)	Source of inspiration (to invent out of necessity)	Overcome quickly
Did you create a plan? When? What was the reason for it?	No	Only with the support of the support structure to develop the idea further and bring it to the market	No	Yes (beginning)	Yes, with sprints and releases, but not too much planning in the creativity part (more in implementation)

In terms of elements of effectuation, a mixed picture emerged from our results. None of the sub-cases showed only elements of effectuation or causation. Sub-case A shows elements of causation such as having a concrete goal, trying to avoid uncertainty and no partnerships. Sub-case B follows mainly an effectuative approach, although nobody entered the project self-selected. The support structure imposed elements of causation, i.e. writing a plan. Sub-case C combines elements of causation such as linear development with elements of effectuation (iteration, own means, self-selected stakeholders and partnerships). Sub-case D created a plan in the beginning, but worked in a highly effectuative way. Sub-case E started with a concrete goal and avoided uncertainty but worked in an effectuative way. The work was done based on own means and highly iterative. Depending on the educational and professional background and the means of corporate entrepreneurs, activities were emphasised or neglected. Corporate entrepreneurs with a technical background worked first and foremost on feasibility, while those with a business background were more thinking of the customer experience.

Corporate entrepreneurs were working highly iterative. In sub-case E, the lead entrepreneur mentioned that they were following a design thinking approach. All sub-cases agreed that they were developing their idea into an internal corporate venturing project based on their own means and developed new skills on the way. Also small experiments were conducted in all sub-cases except sub-case B and E. In sub-case B, the lead entrepreneur emphasised that the activities were not conducted to get rich. Sub-case D mentioned experiments related to affordable loss in terms of shared intellectual property rights to get the idea implemented. In terms of unexpected situations and uncertainty, we received mixed results. Sub-case A reported that getting distance to unexpected situations helps to overcome the situation. Sub-case D embraces uncertain situations as a source of opportunity. We did not receive an answer on this question in sub-case C. Sub-case D emphasised uncertain situations as a source of inspiration, while sub-case E tries to overcome the situation quickly.

Planning was not conducted at all by sub-case A and C, and only with the support of the support structure or internal corporate venturing in sub-case B. Sub-case D conducted planning in the very beginning, while sub-case E conducted planning in the implementation phase, but not so much in the creative part of the project. When asking about means in the way “What can I do? Who do I know, which resources I can get?”, we did not receive an answer from sub-case A and C. In sub-case B, the lead entrepreneur did not ask himself the question, while sub-case D did. In sub-case E, one team member had the skills, was interested, learned new skills, invested personal time and was able to make a prototype and pitch it to top management.

In terms of self-selected team members, we got mostly negative answers (sub-case A, B, D). In sub-case C and E, entrepreneurs joined the team self-selected. The outcomes of the projects reshaped completely in sub-case B, C, D, slightly in sub-case A and E. Partnerships were not considered in sub-case A and E. Sub-case B and D had disappointing experiences concerning partnerships, and only sub-case C achieved a partnership.

The means of corporate entrepreneurs caught our special attention. Depending on the education and professional background of the corporate entrepreneur, the person possesses a different network as well as different skills. Due to this, activities were conducted or neglected. Corporate entrepreneurs with a business background neglected technical development, while engineers mainly focused on feasibility - all engineers neglected business development activities in the idea phase. In addition, others in the organisation focused on the set of means when arguing against an internal corporate venturing project – such as engineers argued with feasibility arguments against an idea from a corporate entrepreneur with a business background. Such arguments were hard to invalidate by the corporate entrepreneur. Furthermore, the study revealed that the means determine whether a corporate entrepreneur actively develops an idea further or not, i.e. because they are distant from the corporate entrepreneur’s core competency. The activities conducted were conducted to the means of corporate entrepreneurs that are unique to every corporate entrepreneur. Corporate entrepreneurs only engaged in initiatives that were perceived feasible to pursue – this feasibility aspect was strongly connected to the own means. New means were acquired during the project. However, means that were not easy to acquire because of their distance to the corporate entrepreneur’s core competency lead towards a more passive role.

Planning was conducted mostly late – the roughness of the first draft was emphasised as a main difference of the internal corporate venturing track opposed to other channels for innovation in the case company. Corporate entrepreneurs emphasised that a long detailing process should be avoided. In addition, the process was conducted in an iterative, nonlinear way, with intense phases as well as phases when the innovation was not developed further. Prototyping, both in early as well as later stages was regarded important to demonstrate the feasibility of the idea. Small experiments were conducted.

Elements of causation were mostly imposed by the gates in the case company and the planning requirements needed to pass the gate and proceed with getting funding to develop the product / service idea.

5 Discussion

In the discussion, we translate the answers from the findings above to the model introduced in section 2. The base of the discussion is thus Table 5, with the empirical findings of our study in bold letters.

Table 5. Elements of Design Thinking (Hassi & Laakso 2011) and Effectuation with empirical findings (in bold).

Practices		Thinking Styles		Mentality	
Design Thinking	Effectuation	Design Thinking	Effectuation	Design Thinking	Effectuation
Human-centred approach e.g. people-based, user-centred, ethnography, observation	Means-driven (Sarasvathy 2008) in connection with user involvement (Abrell & Durstewitz 2014) means-driven (5/5 cases) importance of external stakeholders (Toivonen & Tammela 2013) customer-involvement (Brettel et al. 2012)	Abductive reasoning e.g. the logic of „what could be“, finding new opportunities, urge to create something new, challenge the norm	Creation of opportunities through abductive processes (Sarasvathy et al. 2010)	Experimental & explorative e.g. the license to explore possibilities, risking failure, failing fast	Affordable loss (Sarasvathy 2008) Experimentation and means (Chandler et al. 2011; Brettel et al. 2012) small experiments and affordable loss (4/5 cases) iterations (5/5 cases)
Thinking by doing e.g. early and fast prototyping, fast learning, rapid iterative development cycles	Controlling an unpredictable future (Sarasvathy 2008)	Reflective reframing e.g. rephrasing the problem, going beyond what is obvious to see what lies behind the problem, challenge the given problem	Exploitation of contingencies (Sarasvathy 2008) Outcomes reshaped (5/5 cases)	Ambiguity tolerant e.g. allowing for ambiguity, tolerance for ambiguity, comfortable with ambiguity, liquid and open process	Expert entrepreneur knows that pursuing opportunity is a process with an unknown end (Wiltbank et al. 2006) Exploitation of contingencies (Sarasvathy 2008) Effectuation way to manage under uncertainty and high ambiguity (Brettel et al. 2012; Duening et al. 2012) Ambiguity source of opportunities (2/5 cases) versus overcoming fast (2/5 cases, 1 no answer)
Visualising e.g. visual approach, visualising intangibles, visual thinking		Holistic view e.g. systems thinking, 360 degree view on the issue		Optimistic e.g. viewing constrains as positive, optimism attitude, enjoying problem solving	
Combination of divergent and convergent approaches e.g. ideation, pattern finding, creating multiple alternatives	Experimentation (Chandler et al. 2011)	Integrative thinking e.g. harmonious balance, creative resolution of tension, finding balance between validity and reliability		Future-oriented e.g. orientation towards the future, vision vs. status quo, intuition as driving force	Importance of tacit knowledge and gut feeling in effectuation (Svensrud & Åsvoll 2012) Vision at the beginning (3/5 cases)
Collaborative work style e.g. multidisciplinary collab. involving many stakeholders, interdisc. teams	Stakeholder-involvement based on precommitments (Sarasvathy 2008) no self-selected stakeholders (3/5 cases) and no partnerships (4/5 cases)				

Our empirical findings suggest a strong relevance of the concept of means as it was mentioned in all of the cases as a central element to the development of the idea towards a project that is funded and staffed. Without funding, the corporate entrepreneurs have to rely largely on their own means. However, as Abrell & Durstewitz (2014) point out, means are crucial to obtain a human-centred approach, as users may not be reachable due to company policies.

Sarasvathy (2008) highlights the importance of stakeholder involvement as one central element of effectuation. Our study suggests that there may be a difference between effectuation in entrepreneurship and corporate entrepreneurship as the corporate entrepreneurs reported no self-selected stakeholders and no partnerships. A collaborative work style as in design thinking (Hassi & Laakso 2011) could not be observed, however would be highly beneficial due to the

possibility to enlarge the means of the project team through different skills. As corporate entrepreneurs in the case company had networks largely in their own functions, interdisciplinary teams and multidisciplinary collaboration would need to be facilitated.

Reflective reframing (Hassi & Laakso 2011) could be observed, as the outcomes reshaped in all cases. An experimental and explorative approach (Hassi & Laakso 2011) could also be observed. The corporate entrepreneurs conducted small experiments and followed the principle of affordable loss as well as worked highly iterative. Lastly, the corporate entrepreneurs worked future-oriented, with a vision at the beginning of their entrepreneurial endeavour.

6 Conclusion

Through this study, we contribute to the body of knowledge by conceptually linking the concepts of design thinking and effectuation and empirically explore the model in the context of internal corporate venturing. Thus, we contribute to the discourse of effectuation through empirical evidence of elements of effectuation in a corporate context, especially connected to the concept of means. Furthermore, we contribute to the discourse of design thinking through first evidence from design thinking in a corporate entrepreneurship context.

Design thinking and effectuation show several conceptual connections – both highlight the importance of involving external stakeholders, experimentation, reflective reframing, ambiguity tolerance and future orientation. In the early stage of internal corporate venturing, we find that the means of corporate entrepreneurs are crucial to successfully develop the idea into a concept. Self-selected stakeholders and ambiguity tolerance have been seen critical, which may be a major difference to effectuation in the entrepreneurship context.

Our study opens important implications for practitioners, especially in support entities for internal corporate venturing. The means of corporate entrepreneurs can be complemented through interdisciplinary team building as well as training.

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Inclusive trade: the promise of the global empowerment network

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This article presents research results demonstrating how small businesses in emerging and developing markets, making use of the Internet and technology, export to multiple different destinations. We argue that a new system for engaging in globalization now exists, parallel to the Global Value Chains model. We highlight the policy and legal conditions that support this development towards more inclusive global trade.

1 Introduction

Up until now it has only been the few largest players who have been able to take full advantage of trade and globalization. If a small business wished to participate in the global economy it was largely relegated to providing an intermediate product to a large multi-national supply process (the so-called Global Value Chains model). This model for trade is the result of the immense resources that have traditionally been required to develop an international customer base and deliver a product or service efficiently across borders.

A parallel model for trade is emerging. Technology, particularly drawing on the Internet, is now enabling businesses of all sizes to trade directly with consumers around the world. We refer to this emerging model as the “Global Empowerment Network”.

The Global Empowerment Network brings together a set of conditions, such as Internet connectivity, digital services, and logistics solutions. These conditions contribute to an emerging borderless system adaptable to the needs of individual firms. However, the full potential of this model depends on the right policy, legal and administrative solutions.

This article explores the power of the Global Empowerment Network. Using economic analysis to describe what happens when technology meets trade, we look at what this means for businesses in eight developing and emerging markets and we identify the key policy actions that promote, or detract, from the ability of technology-enabled businesses to effectively reach world markets.

Our aim with this article is twofold. We want to raise awareness of the Global Empowerment Network and its power to support exporting by small businesses in emerging and developing markets. We also want to provide concrete proposals for what policy and legal conditions are conducive to building out and strengthening the Global Empowerment Network.

1.1 Data and methodology

This article builds on economic analysis of eBay Marketplaces data carried out in collaboration with Simon Schropp and Andreas Lendle of Sidley Austin LLP. The results presented are based on two different eBay datasets:

1. A global dataset with all global eBay transactions disaggregated by country of buyer and seller and for the years 2008 to 2012.
2. A more detailed dataset for the eight selected countries (Chile, Peru, Ukraine, South Africa, Jordan, India, Indonesia and Thailand) with information on sales conducted by all sellers based in these countries, including the location of the buyer by country and for the years 2008 to 2012.

For the most part, the analysis of these eight countries was done by considering only those eBay sellers with annual sales of at least USD \$10,000. Hereinafter, we refer to those sellers as “Technology-Enabled Small Businesses” (we refer to trade by these businesses over the eBay Marketplace as “Technology-Enabled Trade”).

To allow for comparisons with what we call “traditional trade”, we have used a number of other datasets:

- The World Bank Exporter Dynamics Database for information on exporters based in Chile, Jordan, Peru and South Africa.
- The World Bank Enterprise Surveys for information on the share of firms that are exporting in the eight selected countries.
- The UN Comtrade database for data on exports from about 200 countries.

The comparison with traditional trade is not intended as a perfect comparison between apples and apples. Rather, the traditional trade image provides a reference point that allows us to home in on the different characteristics of Technology-Enabled Trade.

2 Technology meets trade

A key variable that is commonly found to have a large – and negative – impact on trade is geographic distance: countries further apart trade less with each other. One typically finds that a 10% increase in distance reduces trade by 15-20%. Trade over online marketplaces, such as the eBay Marketplace, is much less affected by distance because of how the Internet and digital services facilitate communication and information exchange and, importantly, trust creation. Our research shows that a 10% increase in distance reduces Technology-Enabled Trade by only around 3%, whereas it reduces traditional exports by 18% i.e. by almost six times as much. Significantly, the impact of technology is even more pronounced in the case of trade from developing countries. We find that a 10% increase in distance results in no more than a 1% decrease in Technology-Enabled Trade from developing countries.

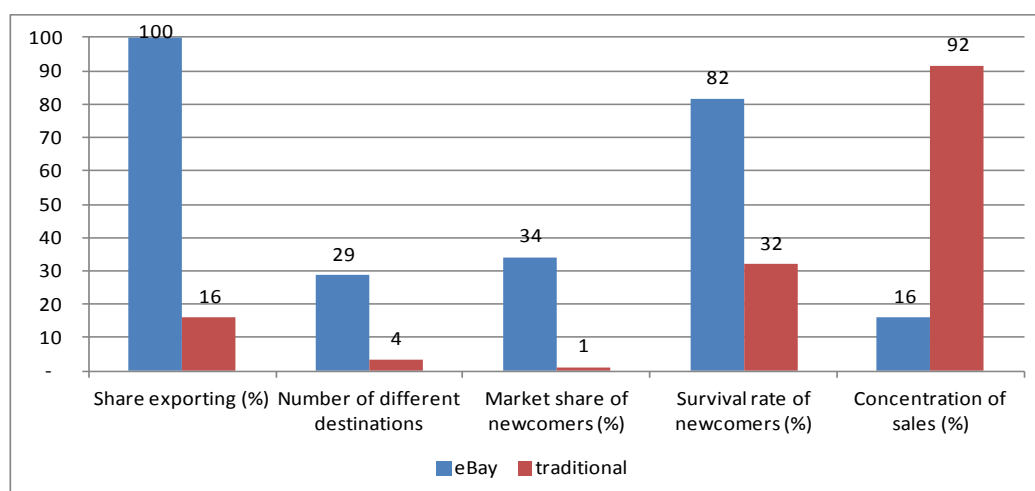
3 A look at eight countries

In order to understand the firm-level implications of reducing the negative effects of geographic distance on international trade, we have carried out detailed research into the trade patterns by Technology-Enabled Small Businesses in eight different countries: Chile, Peru, Ukraine, South Africa, Jordan, India, Indonesia and Thailand. These countries were chosen to complement our previous research, which has looked at developed markets.

In this section, we describe the firm-level effects of the Global Empowerment Network in the eight selected emerging and developing markets and discuss what policy efforts help further positive trends.

3.1 Chile

Our research points to a situation of low entry and start-up barriers for technology-enabled trade in Chile. Combined, Chilean newcomers on the eBay Marketplace reach a market share of about 30% in their first year and around 80% survive that critical first year. We also find that the concentration of sales to the largest traders is high in the traditional marketplace with 92% of Chile's exporting conducted by its 5% largest exporters, whereas in the online marketplace that concentration level is much lower at 16%.



The table above demonstrates the key results for Chile. Our analysis suggests that policy efforts, such as recognizing Small and Medium-sized Enterprises (SME) in trade instruments and upholding strong net neutrality, have contributed to the positive trend our research identifies. Our assessment is furthermore that raising the de minimis (customs relief) thresholds is one type of policy action that could further enhance the ability of Chilean businesses taking advantage of the Global Empowerment Network for exporting.

3.1.1 Recognition in Free Trade Agreements

Recognizing that SMEs engage in international trade and face unique barriers is an important first step to removing the barriers that these businesses face. The Free Trade Agreement (FTA) between the US and Chile contains an important chapter on E-Commerce where Article 15.5 recognizes the global nature of technology-enabled commerce and the importance of adding specific measurable requirements on the governments to remove barriers to technology-enabled SME trade.

3.1.2 Network Neutrality

Small business entities are the most likely to be discriminated against or blocked because they do not have any leverage against Internet Service Providers (ISPs). Larger entities may be able to afford to pay for faster service provision, or utilize their large user bases to exercise leverage against an ISP. Small entities do not have such means. Maintaining an

open playing field on the Internet, where every actor on the edge of the network has an equal opportunity to access a consumer, brings clear benefits to small and medium sized Internet businesses.

Chile was among the first countries to codify the doctrine of net neutrality. An amendment of 2010 to the Telecommunications Act prohibits ISPs from arbitrarily blocking, interfering, discriminating, hindering, or restricting the right of any Internet user to engage in lawful use of the network. This law ensures that the Internet will remain equally open to businesses, and consumers, of all sizes.

3.1.3 Raise the De Minimis Threshold

The de minimis threshold is the monetary level below which an importer of physical goods is exempted from customs duty and paperwork requirements. The Chilean de minimis threshold is currently set at only USD 30. This low de minimis threshold slows down cross border technology-enabled trade for Chilean consumers, but also more importantly, limits the ability of Chilean technology-powered traders to offer returns services to their global customers.

Returns are an essential part of the retail experience. In the current environment, providing cross border returns is difficult for technology enabled businesses because if a good is valued at a level above the de minimis threshold, then upon its return it may be subject to customs duty and paperwork requirements, and the responsibility for those would fall on the seller.

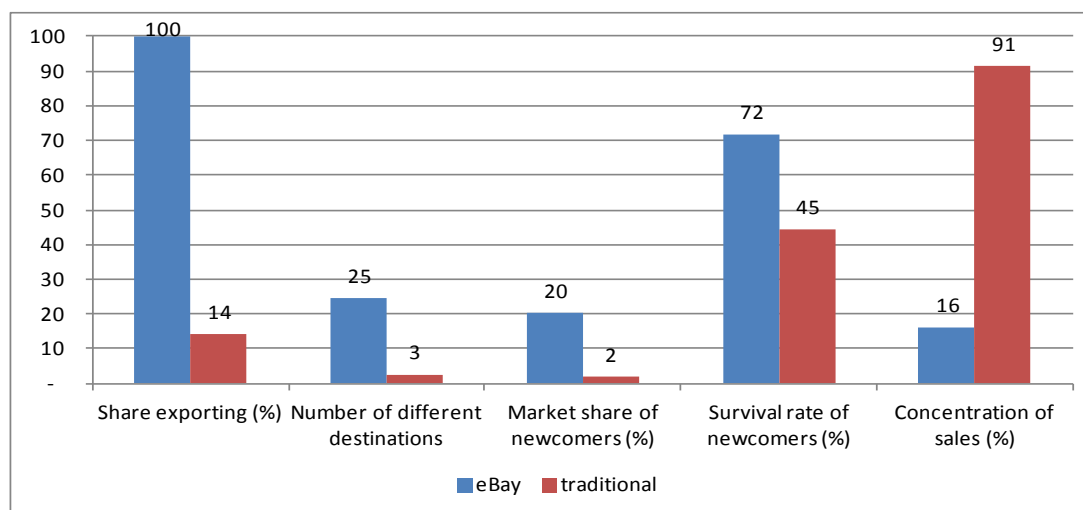
Rather than offering returns, many times a seller from a country with a low de minimis threshold will refuse to offer returns or will simply ship a new product rather than dealing with the hassle of receiving a return.

Chilean sellers that want to offer returns should not be subject to additional burdens. Several members of the Asia Pacific Economic Cooperative (APEC) signed a pathfinder initiative in November of 2011 that recognized the importance of providing higher de minimis levels. Members that signed the pathfinder initiative agreed to raise their de minimis threshold to USD 100 by the end of 2012. Chile is, unfortunately, not one of the participating economies in this initiative; we urge Chile to reconsider raising its de minimis level.

3.2 Peru

Peru is one of the countries where Technology-Enabled Trade is particularly helpful in overcoming the barrier of geographic distance. Traditional trade flows are significantly negatively affected by distance – a 10% increase in distance reduces Peru's exports by 20%. In contrast, exports over digital services networks such as the eBay Marketplace are about 10 times less affected by distance. The "death of distance" is a reality for Peruvian firms.

Our research also suggests that small Peruvian firms seize this opportunity. We find that all Technology-Enabled Small Businesses in Peru export, reaching on average 25 different foreign markets – in contrast to traditional exporters, who reach three markets on average. In total, these Technology-Enabled Small Businesses export to 100 different foreign markets.



The table above shows the key research results for Peru. Our policy analysis suggests that these results are supported by relatively high de minimis levels in Peru as well as efforts to ensure balanced liability for online intermediaries. The latter is key to cultivating an environment where small firms can build their operations on third party services and platforms. However, and going to the finding of particularly pronounced "death of distance" for Peruvian international trade, we warn that intellectual property rights regimes can have the effect of raising geographical barriers where technology has dismantled them.

3.2.1 *Relatively high De Minimis*

Peru has its de minimis threshold set at USD 200. This enables Peruvian businesses to offer returns on their products and lowers costs and delays for Peruvian consumers. The Peruvian de minimis level is the highest of the countries discussed in this report. But other countries around the world have even higher de minimis levels. Australia has its de minimis level set to USD 1'000. An eBay commissioned report entitled *Enabling Australian Export Opportunities* demonstrated that Australian technology-powered exporters have seen strong growth in the past few years. Moreover, legislation has been introduced in the United States to increase the de minimis threshold from USD 200 to USD 800.

Peru has set the benchmark for other countries in this study with its USD 200 de minimis, but Peru can also see additional cost savings by increasing its current de minimis level.

3.2.2 *Limitations on Liability for Internet Intermediaries*

A well-functioning Internet relies on intermediaries that provide online services and build communication networks for user interaction. The growth of intermediaries is directly correlated to the growth of the digital economy. These intermediaries serve as platforms for large amounts of users; it is not possible for intermediaries to proactively monitor all of the actions of their users. Limitations on liability enable online platforms to host user generated content without risking unmitigated liability

An example on point is the provision that formed part of the US-Peru FTA stipulating limitations in national law regarding the scope of remedies available against service providers for infringements of intellectual property rights that they do not control. Appropriately crafted liability limitations are crucial for the development of the Global Empowerment Network.

3.2.3 *Clarify Scope of Exhaustion of Copyright and Trademark as International*

Intellectual property rights, such as copyright and trademarks, grant a manufacturer the right to control the initial marketing of the product. Once the product has been put on the market – for instance sold to a consumer or to a retailer – the copyright/trademark owner can no longer use the copyright/trademark rights to exercise control over that product: the owner has exhausted that right. The exhaustion doctrine promotes alienability of goods, rewards innovative sourcing methods, provides a backbone for a robust secondary market, and prevents harmful downstream market restrictions.

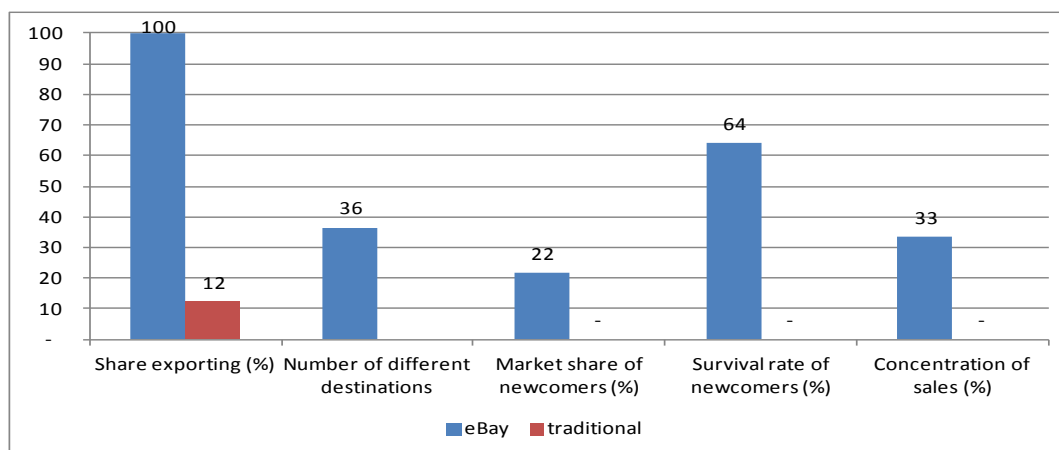
Some countries apply the international exhaustion doctrine whereby the rights are exhausted irrespective of where the products have been put on the market. Other countries exercise more restrictive doctrines where exhaustion only occurs if the product is placed on the market in that country or within a region.

Here, Peru should clarify that its copyright and trademark laws follow the international exhaustion doctrine – once a good is sold anywhere in the world its distribution can no longer be controlled by the rights owner. For instance, it is unclear under Peru's copyright law when the copyright owner's right to control importation is exhausted; rights owners can exploit this uncertainty to restrict sales of legitimate products into Peru and thus prevent Peruvian consumers and firms from sourcing from world markets. Copyright and trademark law should not be used as a tool to prevent the lawful trade of goods and slow down the "death of distance".

3.3 Ukraine

At the time of writing, the situation in Ukraine with the occupation of Crimea is worsening. Nevertheless, we would like to put forward our research findings and analysis in the belief that facilitating and supporting small business exporting should form part of Ukraine's strategy for economic recovery and participation in the global economy as well as in closer cooperation with the EU.

Indeed, our research points to a huge potential in technology-enabled trade for the Ukraine economy. We find that Ukrainian Technology-Enabled Small Businesses are among those reaching the largest number of foreign markets – on average 36 different markets and in total 152 different markets around the globe.



The table above sets out the key findings for Ukraine. These findings should be read in the context of general Internet trends: according to ITU figures, Ukraine had an Internet penetration of 31% in 2011, up from 5% in 2006 and the use of mobile Internet is also rising as an estimated 16% of urban Ukrainians have access to the mobile Internet.

Pursuant to our policy assessment, we would therefore emphasize initiatives in the area of high-speed mobile broadband as a key for positive developments in technology-enabled trade. Likewise, we suggest that the shift, encouraged in Ukraine, towards electronic documents in administrative procedures is a very important factor in facilitating international trade. However, to further improve the entry and participation of small businesses in trade as well as their competitiveness vis-à-vis large established exporters, we call for continued modernization of national postal systems, which includes strengthened international integration.

3.3.1 High Speed Mobile Broadband Investment

Ukraine's Open World project is designed to develop a 4G broadband network throughout Ukraine. The initiative promotes educational uses of the Internet and describes how a wide variety of services will be enabled by increased broadband adoption

This program reflects a key understanding of the Internet, namely that value is created at the edge. Moreover, the more users on the network the more valuable the network becomes. The project brief also notes that the state will "create a beneficial regulatory environment." This statement demonstrates that the Ukrainian government recognizes that deployment of broadband is not enough. Regulatory policies across the board must be updated to foster the digital environment.

3.3.2 Electronic customs processing

Ukraine has a long-standing Law on Electronic Documents, which puts electronic documents on legal par with paper documents. More importantly, however, the new Customs Code of Ukraine, which took effect in June 2012 and is part of steps towards closer EU cooperation, is encouraging the use of electronic declaration forms. The new Customs Code also enables customs rulings to be delivered electronically.

Simplifying customs processes by allowing for goods to be declared electronically is an important measure towards facilitating the participation of small businesses in international trade.

3.3.3 Continue to Modernize Ukrainian Post

The Ukrainian postal operator Ukrposhta is a state enterprise, operating as an independent unit since 1994. In 2008, the Minister of Transport and Communications recognized that the Ukrainian postal service needed to improve operations.

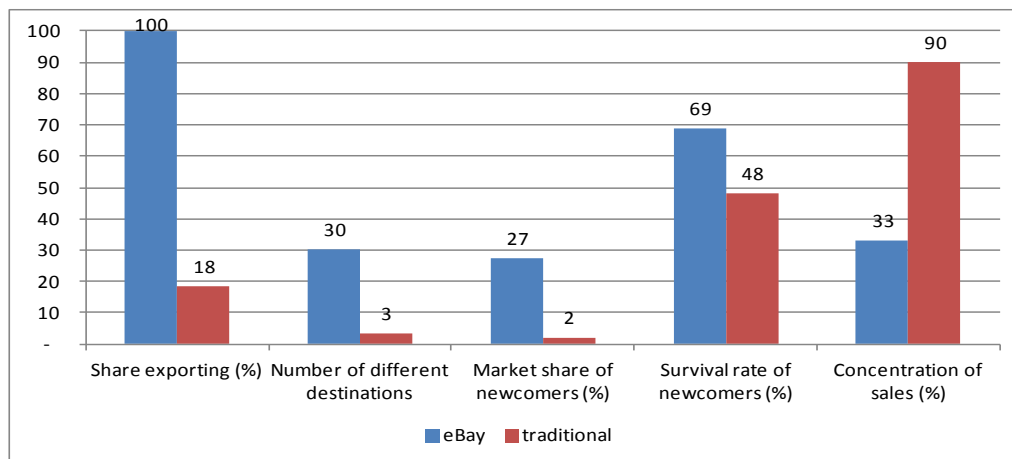
Ukraine has met the Universal Postal Services (UPU) "A-Level" rating. A UPU report from 2011 found that Ukraine ranked among the top 25 countries in postal e-services development. Yet, in the World Economic Forum's Enabling Trade Report of 2012, Ukraine was ranked 74 out of 132 in postal service efficiency.

The Ukrainian postal service could continue to improve by promoting technology services that leverage efficiencies in scale and aggregation to achieve volume discounts. Ukrposhta would also benefit from working with other countries to harmonize shipping platforms between countries. Finally, Ukrposhta could work with the private sector to create interoperable systems that both the public and private sectors can utilize. Creating interoperable tracking systems would enable merchants and consumers to track their packages throughout the shipping process, and thus to improve reliability.

3.4 South Africa

Our economic analysis shows that Technology-Enabled Small Businesses in South Africa sell more to distant markets than to markets closer to home; in contrast, traditional exports decrease with distance. Overall, these Small Businesses

reach 118 different markets worldwide. Adding to the picture, our research shows strong performance by newcomers – with those in the online marketplace accounting for 27% of sales compared to merely 2% in the traditional marketplace.



The table above sets out the key research findings for South Africa. We would attribute some of the positive trends to South Africa's ambition to harmonize bilaterally and multilaterally both customs processes and postal systems. Pursuant to our policy assessment, we would however urge continued efforts in improving Internet connectivity and access to strengthen the ability of the Global Empowerment Network to facilitate international trade by remote and small firms.

3.4.1 Harmonization and Modernization of Customs Processes

The South African Customs Union (SACU) is the world's oldest customs union. Its members include Botswana, Lesotho, Namibia, South Africa, and Swaziland. It was designed to encourage the free movement of goods between member countries. In 2009, the SACU in conjunction with the World Customs Organization launched a three-year initiative designed to create harmonized customs policies in the region. The initiative was also designed to improve risk management and information technology aspects of customs in the region.

Small businesses are disproportionality affected by complicated customs procedures. Harmonizing procedures reduces the number of considerations a small business needs to account for when engaging in trade. Modernizing standards, particularly through the introduction of technological solutions, greatly reduces costs for small businesses and reduces barriers to the customs process. Standardization and simplification of customs processes should be a central goal for governments around the world that are interested in seeing an increase in technology-enabled exporting by SMEs.

3.4.2 Harmonization and cooperation on postal

The South Africa-European Union Agreement on Trade, Development and Cooperation Article 56 contains unique language on postal cooperation. It calls for cooperation in the area of postal to include:

- Exchange of information and dialogue on postal matters in relation to, inter alia, regional and international activities, regulatory aspects and policy decisions
- Technical assistance on regulation, operational standards and human resource development
- Promotion and implementation of joint projects, including research, on technological development in this sector

This provision is notable for two reasons. First, postal services are included in the discussion of an FTA. Second, policy, regulation, and technological development are all identified as keys to cooperation.

Harmonization and simplification of policy and regulation, as well as increased technological investment and development of postal services are extremely beneficial for technology-enabled firms that utilize the postal service to deliver their goods around the world.

We would urge moving some of these aspirations from a bilateral discussion to a multilateral context. That would be greatly beneficial as multilateral harmonization would further reduce divergent burdensome standards.

3.4.3 Investing in Broadband Access Proliferation

South Africa has the laudable goal of universal broadband access by 2020. However, in 2013, a report by the Broadband Commission, an international body set up by the ITU and UNESCO, ranked South Africa at 111 out of 183 countries on fixed broadband penetration (2.2 connections per 100 inhabitants). On a positive note, the report noted that South Africa ranked number 62 out of 170 countries on mobile broadband penetration (26 connections per 100 inhabitants).

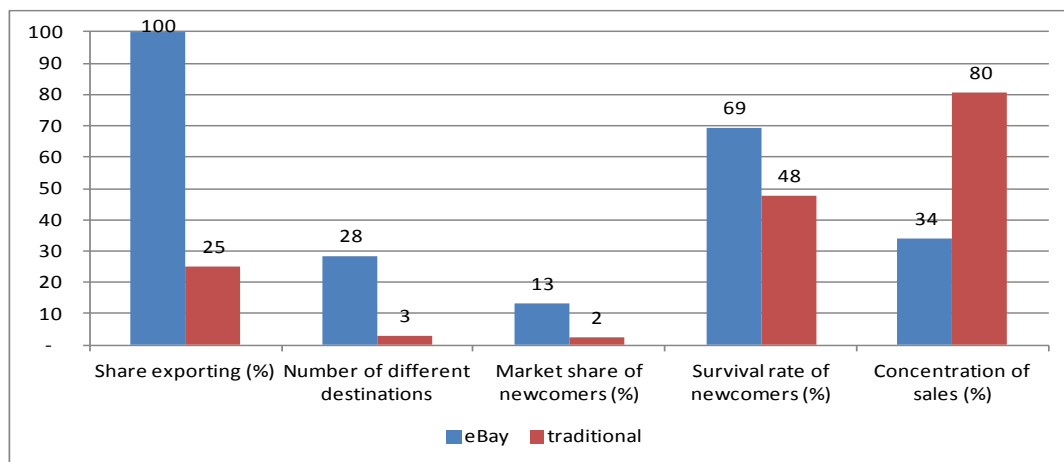
South Africa does have a national broadband plan, which was drafted in 2010. But there have been delays at the national level and lack of coordination of implementation at the local level, which have impeded the rapid distribution of broadband access.

Needless to say, ensuring that citizens from every economic level and in every part of the country can access a high speed connection is an essential step in creating inclusive participation in and spur the development of global, borderless markets.

3.5 Jordan

Our research confirms that Technology-Enabled Small Businesses from Jordan adopt export strategies similar to those in other countries. These Jordanian Technology-Enabled Small Businesses export and reach customers in on average 28 different markets and in total 93 different countries. In comparison, traditional exporters reach only three different markets on average. We also find that survival rates of newcomers and the concentration level of the largest traders to be similar to the findings for the other countries discussed in this article, including the five developed countries.

However, we note that the market share of newcomers is comparatively low in Jordan. Newcomers in the online marketplace account for 13% of sales, which is the lowest among the eight countries selected for the research. To put this in perspective, 13% is still significantly higher than the 2% found for newcomers in the traditional marketplace.



The table above gives the key research results for Jordan. Studying the Jordanian policy landscape, we have tried to identify policy initiatives that could both explain these results as well as spur further positive development. Here, we believe Jordan's efforts putting in place a national e-commerce strategy and promoting competition in electronic payments to be key measures already underway. We also believe that measures that derail uptake of new technology must be avoided and runs counter to the ambition of promoting electronic commerce and payments; rather, promoting the usage of smartphones should form part of the national e-commerce strategy.

3.5.1 Comprehensive National E-Commerce Strategy

In 2007, Jordan's Ministry of Information and Communications Technology launched its National E-Commerce Strategy. The vision behind the Strategy is for Jordan "to become a leading e-commerce centre in the region through the exploitation of its information technology capacity and the creativity of its people." The Strategy recognizes the relevance to e-commerce of a range of policy areas, such as payments policy, consumer protection, information communications technology, customs, and tax policy. It also draws up specific actions, for example in the area of encouraging SMEs to take up e-commerce.

We support the model of creating a national strategy as it allows a government to holistically, across policy areas, consider the appropriate conditions for technology-enabled trade. We suggest the Global Empowerment Network would make a helpful conceptual framework when constructing such a strategy.

3.5.2 Competition in electronic payments

One of the digital services that is key to a well-functioning Global Empowerment Network is electronic payments. It is therefore encouraging to note that Jordan's National E-Commerce Strategy recognizes the central role of globally accepted electronic payments. It lays out a specific action plan to increase consumer usage of electronic payment methods.

In addition, the 2001 FTA between the US and Jordan was the world's first trade agreement to include a chapter on e-commerce. Adjacent to the FTA is a Joint Statement on Electronic Commerce with a number of important principles and recommendations. In particular, the Joint Statement makes a strong declaration on electronic payment systems: "Developments in this area should recognise the importance of private sector leadership and should promote both a competitive market for, and user confidence in electronic payment systems."

We encourage Jordan, and other countries, to follow down the path of promoting competition in electronic payments in FTAs as well as national e-commerce strategies.

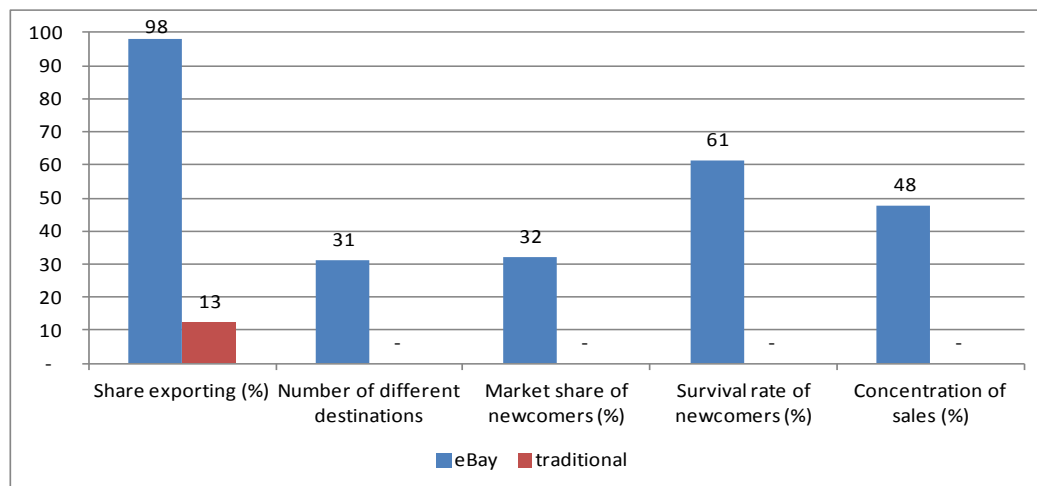
3.5.3 Reconsider the high taxation on mobile phones

A Cabinet decision published in the Jordan Official Gazette in July 2013 raised the special tax on mobile phones to 16% from 8%. The decision also raised the tax on mobile subscriptions –pre- and post-paid – to 24% from 12%.⁴³ This tax not only affects consumers but it also affects businesses of all types that are using mobile devices to optimize processes and develop new mobile services. The Jordanian Consumer Protection Society (CPS) has stated that it plans to file a lawsuit against the government because of the decision to raise taxes on mobile phones and subscription.

The government should reconsider its high tax on a technology that is enabling business innovation and consumer empowerment.

3.6 India

Our research results for India confirm the ability of technology and the Internet to lower entry barriers. In total, Technology-Enabled Small Businesses in India reach 194 different markets and newcomers account for around 32% of exports in the online marketplace and have high survival rates.



The table above presents the key results for India. Our policy assessment suggests that these results are underpinned by efforts to increase and improve Internet connectivity across India and encourage a shift away from cash and towards electronic payment methods. We note that our research suggests that Indian large firms seem to be in a relatively stronger market position than small firms, also when compared with the other countries discussed in this article. Our policy recommendation would be for the Government of India to enact procedural reforms to simplify export processes for SMEs, taking into account their lack of experience and limited resources.

3.6.1 National Optical Fibre Network

Positive policy actions over last several years have resulted in a fast growing mobile telephony and data market with about 870 million subscribers and one of the lowest tariffs in the world. The mobile Internet users in the country are expected to grow from 4.1 million users in 2009 to 164.8 million in 2015 at a CAGR of 85%.

India should continue promoting investments in connectivity. For example, the Government of India approved on 25 October 2011, the setting up of National Optical Fiber Network (NOFN) to provide connectivity to all the 250,000 Gram Panchayats (GPs) in the country. This is to be achieved utilizing the existing optical fiber and extending it to the GPs. This would ensure broadband connectivity with adequate bandwidth. Moreover, in the last 5 - 10 years, India has significantly liberalized and opened up its telecom sector with broadband wireless, 2.3 GHz spectrum and 3G auctions to private sector companies for broadband & wireless services. In 2013, the government allowed Foreign Direct Investment in the telecom sector to 100%.

3.6.2 Encouraging a "Less-Cash" Economy

With the rise of online commerce, it is important that electronic payment methods advance to meet the needs of the consumer. A regulatory policy that encourages a shift towards electronic payment methods will no doubt help the online commerce experience in India continue to thrive.

The Reserve Bank of India's (RBI) Payments System Vision document 2012 states:

"The overall regulatory policy stance is towards promoting a less cash/less paper society, the 'green' initiative, and hence the increased emphasis on the use of electronic payment products and services that can be accessed anywhere and

anytime by all at affordable prices. Embracing new technology and innovation to unveil a bouquet of simple low cost, easy to use modern payment products and services would be the corner stone of this endeavour.”

This is an extremely positive statement as electronic payments methods empower consumers and improve security for the system. Cash and check, however, currently remain major methods of payment in India. RBI’s document recognizes the shortcomings of the current model and calls for a need to substitute cash-on-delivery with non-cash payment modes such as mobile wallets, cards etc.

The RBI has also enhanced the limit for exports processed by an online payment gateway from \$3000 to \$10,000 per transaction. This will no doubt help Indian small business exporters to sell their locally manufactured goods around the world.

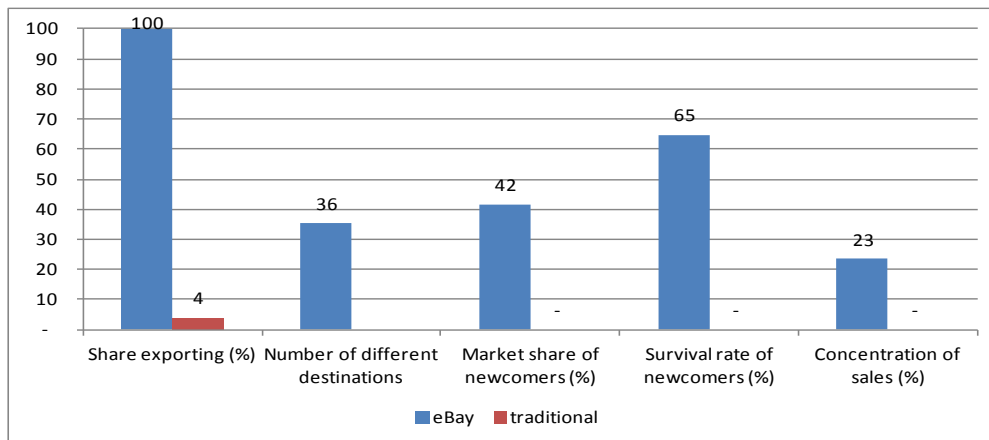
3.6.3 Facilitated procedures for technology-enabled trade

In 2012, the Ministry of Commerce recognized the importance of technology-enabled exports for small businesses.⁵¹ The Ministry of Commerce encouraged small businesses in India to begin to take advantage of technology services, and worked with thought leaders like the Federation of Indian Export Organizations to create seminars, incentives, and best practices to help ease the transition for small businesses. Implementation of these aspirations has proven to be difficult.

Now that a high-level commitment to technology enabled small businesses has been made, the government should enact procedural reforms to simplify export processes for small businesses. Currently, export clearance, notifications, VAT, services taxes, and valuation are all issues faced by technology-enabled traders in India. Addressing these challenges through simplified procedures would be of tremendous benefit to the growing sector of technology-enabled businesses.

3.7 Indonesia

Our research finds that Indonesian Technology-Enabled Small Businesses are among those reaching the largest number of foreign markets. They reach on average 36 different foreign countries, and overall they export to 162 different markets. Underscoring this finding of easy access to world markets, newcomers are effective in gaining market shares, accounting for 42% of all sales. There is also a fairly low degree of concentration to the largest firms in the online marketplace: only 23% of sales are conducted by the largest 5% of all Technology-Enabled Small Businesses in India.



The table above gives the key research results for Indonesia. Our policy assessment has identified two separate initiatives, which both support the Global Empowerment Network for Indonesian consumers and businesses and can help explain some of the promising research results. Those are investments in branchless banking and mobile wallets and efforts to develop the logistics industry. In order to not undo the effect of such initiatives, we warn against localization proposals that seek to nationalize otherwise global operations.

3.7.1 Branchless banking pilot programs

Indonesia has a large rural population, and the Internet is an incredible tool for connecting this population to essential financial services. The Indonesian government has recognized this and is investing in branchless banking and mobile wallets through its National Financial Inclusion Strategy. The plan includes improving financial education and facilitating the ability of intermediaries to enter the process of giving consumers access to a variety of financial tools.

The key to the success of these investments will be to ensure openness and competition in the mobile wallet environment. Allowing innovative new players to offer Indonesian consumers a mobile wallet solution will be imperative to ensuring that Indonesian customers are able to enjoy the benefits of a “cash-light” economy

3.7.2 *Reviewing customs with aim of trade facilitation*

In January of 2012 Indonesia signed the ASEAN Australia-New Zealand FTA. Chapter 4 Article 4 of the FTA states: “The customs administration of each Party shall review its customs procedures with a view to their simplification to facilitate trade.”

Frost & Sullivan predicts that the Indonesian logistics industry will grow 14.5% year-over-year in 2013. Frost and Sullivan credit the Government’s initiatives and development of the logistics industry for much of this growth. Yet, Indonesian customs processing is largely still done in paper form, and a move towards paperless trading could further enhance the productivity gains aimed at by the above provision.

3.7.3 *Avoid localization proposals*

The strength of the Internet is that it is an open distributed network enabling information to travel to its destination through the most efficient path. Introducing any additional barriers beyond basic protocols makes the network less efficient. Requiring that all businesses operating in Indonesia acquire a “.id” global top-level domain is an unnecessary burden on the Internet. It limits the potential of the Internet by bifurcating a website operators’ attention, perhaps unnecessarily, to a unique “.id” site. It should be up to the website operator to determine if s/he wishes to setup a “.id” site that is independent from its other sites.

There is an understandable desire for government to have law enforcement authority over websites operating in country. But, good faith corporate citizens will comply with law enforcement requests regardless of whether the corporate citizen has a domestic domain name. Domestic Indonesian businesses that are export-oriented will be harmed by this requirement since they will be forced to operate a “.id” alongside another international-facing global top-level domains even though their products are aimed primarily at international consumers.

3.8 Thailand

Among the countries covered by our research, Thailand is the most effective in reaching a large number of different markets. We find that Technology-Enabled Small Businesses based in Thailand reach in total practically all countries in the world – 198 countries. On average, those Small Businesses trade with 43 different markets. One explanation is to be found in the fact that geographical distance has no statistically significant effect on Technology-Enabled Trade from Thailand. Interestingly, geographical distance has a comparatively very low negative effect also on traditional trade: an increase in distance by 10% reduces traditional trade from Thailand by about 6%, compared to typically 15 – 20%. The consequence is likely the high share of exporting also by traditional traders in Thailand, as shown in the table below.

The table above presents the key results for Thailand. We would attribute the high export share and number of destinations to Thailand’s ambitions in the area of electronic submission of trade administration documents as well as efforts to increase Internet access. However, we emphasize that building an effective digital economy also requires balanced legal regimes for online intermediary liability.

3.8.1 *Electronic submission of trade administration documents*

Small technology-enabled traders are accustomed to conducting business online, and having to obtain paper copies of customs forms and turn them in to a physical location can be a large burden. Facilitating this type of trade therefore includes processes for accessing and managing customs forms and other trade administration documents online.

Working together bilaterally and ideally multilaterally and/or in international fora to enhance the acceptance of electronic trade documents is important as harmonizing rules across the international landscape is key for the global digital economy. For example, the Thailand-Australia Free Trade Agreement (TAFTA) contains a provision on Paperless Trading in its Article 1107. It stipulates as the general rule that the parties shall accept the electronic format of trade administration documents as the legal equivalent of paper documents.

However, we would point out that electronic acceptance is merely the first stage in optimizing customs for the 21st century. Online submission, interoperable systems, and application programming interfaces (APIs) that enable importers and exporters to plug data elements into a customs agency’s back-end system should be aspirations that customs agencies around the world should aspire to.

3.8.2 *Working to increase Internet access*

In 2003, Thailand began in earnest its efforts to bridge the gap between those who benefit from technology and those that do not. The Ministry of Information and Communication Technology has been working hard to provide accessible Internet to the disadvantaged and disabled. For example, the Budget PC project brought millions of computers to Thai citizens.

In a survey of rural Thailand, 60% of respondents reported using the Internet daily for e-mail. Notably, only 24% of those surveyed reported they used the Internet daily for online shopping and only 12% reported using the Internet daily for mobile banking. These figures indicate that while much has been done to increase access to the Internet there is still more that can be done to tie rural Thailand into the global digital economy.

3.8.3 Intermediary liability for offenses of third party users

Thailand's Computer-Related Offences Commission Act has been the subject of controversy as a result of provisions, which arguably could hold intermediaries liable for content placed on their platforms by third parties. Section 15 of the Act holds service providers liable if they "intentionally support or consents" to an offense of the Act.

There is a need to target the enforcement of Internet crimes in a smart and tailored manner. Intermediaries should not be held responsible so long as they take the content down after receiving valid notice from the relevant authorities and cooperate within a reasonable framework.

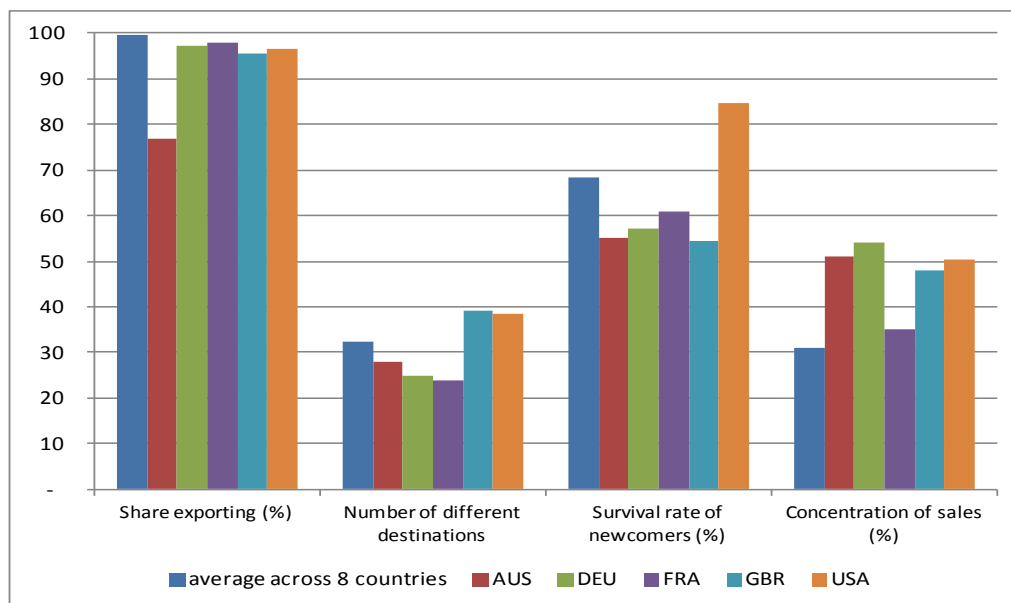
Consumer protection and security are legitimate goals for regulation, but regulation must be aimed at the actor that has violated the law rather than the platform that the actor has used. It is neither technically possible nor economically feasible for intermediaries to monitor all of their users' actions. We propose that Thailand should consider creating a safe harbor provision for intermediaries that exempts them from liability for the actions of their users.

4 When technology is put to use

The research presented in the previous section allows us to conclude that there are stark contrasts between Technology-Enabled Trade and traditional trade in the eight selected markets. Almost all the Technology-Enabled Small Businesses are exporters. In comparison, according to the World Bank survey data, roughly 10–20% of traditional firms across the eight countries report that they export. (Thailand is an outlier, with three out of four firms reporting to export.) Moreover, these businesses reach on average 30 to 40 different markets, whereas traditional traders serve on average three to four different markets.

Data from the World Bank shows that conventional exporting is dominated by established firms, with newcomers accounting for a mere 1–2% of exports. The data also shows that the largest 5% of firms typically account for 80 - 90% of all exports of a country. In contrast, across the eight selected countries, the share of "newcomers" on the eBay Marketplace (defined as sellers that did not make any sales in the previous year) is on average around 26%, and in some countries even more (e.g., 42% in Indonesia). Moreover, these "newcomers" have a much higher chance to remain in the market: we find that 60–80% of newcomers survive their first year, while the respective figure for traditional exporters is significantly lower. Only around 30–50% of such exporters remain active in their second year.

This research also allows us to conclude that Technology-Enabled Small Businesses in developing and emerging markets are remarkably similar to those in developed markets in terms of the share exporting, the number of foreign countries they reach on average as well as survival rates and concentration of sales among the largest of traders. This conclusion can be drawn based on the research presented in this article together with previous economic analysis of eBay data (presented in a number of "Commerce 3.0" reports).



The table compares key research results of developing, emerging and developed markets. We have aggregated the results of the eight countries selected for this article and compared with results for Australia, Germany, France, the UK and the US. Overall, these findings demonstrate that the benefits of new technologies are spread in very similar ways across markets in different regions and at different levels of economic development.

We argue that these findings demonstrate how the Global Empowerment Network supports small traders in developing and emerging markets to reach customers all around the globe. These trade patterns are almost identical to what we have previously identified for developed markets while in stark contrast to traditional trade patterns.

5 Final word

Perhaps the single most important finding from the research presented in this article is that the very same trends and benefits our previous research identified in developed markets are present in developing markets. Firstly, geographic distance has little negative impact on online trade flows. We have found that true for trade flows arising from developed as well as developing markets. Secondly, technology and the Internet foster multi-country exporters. We have found that the large majority of small business traders on eBay in both developed and developing markets reach on average about 30 to 40 different foreign markets.

Against these research findings, we conclude that the Global Value Chains model (i.e., whereby small businesses enter the global market by becoming a part of the production process of a much larger firm) is not the only way for small businesses to reach and service customers in international markets. The combination of the Internet and digital services make it possible for businesses anywhere to reach consumers everywhere. This means that sustainable global operations can spring out of small local establishments.

We argue that our research demonstrates the existence of an alternative, complementary, path to globalization. That path is made up of effective Internet connectivity, adaptable digital services and cross-border logistics; when brought together, these conditions allow also small traders to serve world markets as this article has described. We propose this alternative globalization model be called the “Global Empowerment Network”.

While the Global Empowerment Network is underpinned by technology, its effectiveness also depends on the right legal rules and administrative procedures as the policy assessment presented in this article emphasizes. We have identified the following policy areas as key for creating conditions that enable also small business traders to access and serve foreign markets:

- Investment in open, interconnected broadband and smartphone technology
- Optimized and harmonized shipping and postal regimes
- Robust intermediary liability protections
- Increased and harmonized de minimis thresholds
- International exhaustion of copyright and trademark rights
- Promoting electronic payment methods
- Improved customs processes through increased technology adoption
- Recognition of technology-enabled SMEs and the global empowerment network in free trade agreements

We are excited about the continued growth of the Global Empowerment Network and believe it will be an integral part of global trade in the future.

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Development of a Knowledge Management framework to support installed base information management practices in a servitized context

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In the last decades, growing competitive pressures and increased customer expectations have pushed manufacturers to extend their offerings through the provision of value-adding services (i.e. servitization). However, this transition is challenging and risky. The current research, by adopting the lens of Knowledge Management theory, aims to shed a light on how the adoption of procedures and technologies aimed to collect, organize and exploit the information related to the use of the product and services by the customers can act as an enabler of the servitization process.

1. Introduction

Wise & Baumgartner (1999) suggested western manufacturers to go downstream to achieve a steady stream of revenues through the provision of services, given the high installed-base-to-new-units ratio (e.g. 13 to 1 for automobiles, 15 to 1 for civil aircrafts and 22 to 1 for locomotives). In recent years, due to increasing competitive pressures, evolving customer needs and demand stagnation, the *servitization* of manufacturers, defined as the process of creating value by adding services to products (Baines et al. 2009) has become a topic of great interest amid Operations Management scholars. Such transition from products to services that underlies the concept of service orientation described by Oliva & Kallenberg (2003) has been also labelled as Industrial Product-Service System (Meier et al. 2010) and service infusion (Brax 2005; Gebauer 2008; Holmström et al. 2010). Companies undergoing this transition move towards the provision of Product-Service Systems (PSS), i.e. integrated product and service offerings that deliver value in use (Baines et al. 2009). Strategic and organizational patterns through which manufacturers evolve their offerings and increase their service orientation have been investigated (Davies et al. 2006; Gebauer 2008; Gebauer et al. 2010; Mathieu 2001).

This paper presents the preliminary results of a long-term study that aims to increase the understanding of the relationship between manufacturers' service orientation/strategy and the implementation of Knowledge Management practices such as collection, analysis and utilization of data generated from the use and support of industrial equipment (the so-called installed base information management), that can act as enablers of the servitization process (Neely 2009; Ng & Nudurupati 2010; Greenough & Grubic 2010; Ulaga & Reinartz 2011).

Despite multiple evidence presented in literature (such as the Rolls-Royce success case) and practitioners' growing interest in the management of information generated during products' lifecycle (Dutta 2009), what emerged from a preliminary study of the literature is the lack of a comprehensive treatment of the installed base information management topic (Ala-Risku 2009). In particular, a research gap concerns the investigation of the relationships between information management enabling technologies (such as RFID and Wireless Sensor Network), operations management activities related with the provision of PSS and business model addressing the offer of PSS (among the few exceptions are Yang et al. 2009 and Greenough & Grubic 2010). More specifically, the scientific community has not developed yet an interpretative theory of the role and impact of installed base information management practices in the servitization of manufacturing. The present research aims to fill this knowledge gap by adopting a holistic perspective on the topic of installed base information management, investigating the role of installed base information for the provision of PSS through the lens of Knowledge Management theory. This paper, therefore, addresses the question: *How can the role of installed base information in the servitization processes be analysed through the Knowledge Management theoretical approach?*

2. Background

Research and anecdotal evidence suggest that manufacturers undertaking the path towards servitization face several challenges, that may generate inconsistencies, e.g. between strategic intentions and internal organizational arrangements and even more with external elements. Obstacles arise at both the demand and offer sides of the market. Among the most cited obstacles there are customer's psychology, manufacturer's mindset and economic increasing risks. In this challenging context, the adoption of technology and management practices aimed to handle the information related to the use of the product and services by the customers have been addressed by some scholars as enablers of the PSS and as a mean to overcome or mitigate the increasing risks for manufacturers (Wise & Baumgartner 1999; Neely 2009; Oliva & Kallenberg 2003; Auramo & Ala-risku 2005; Cohen et al. 2006). The present study is grounded on the following concepts: i.) Installed Base Information, defined as all technical and commercial data related to installed base and needed for operation or optimization of industrial services, and ii.) Installed Base Information Management as the set of practices that companies adopt to collect, analyse, use and share data concerning installed products and their utilization. Both these definitions are based on the work of Ala-Risku (2009) that defines Installed Base as a collective

noun for currently used individual products sold or serviced by the focal firm, suggesting that *every single product* sold and serviced by the firm can be a valuable source of information. For instance, Jagtap and Johnson (2011) highlight the importance of collecting in-service information in the aerospace industry and draw a comprehensive list of such information, that range from product deterioration level to maintenance, operating, reliability, availability data and also customer information. According to Jagtap and Johnson (2011), the collection and analysis of these of data allows reducing maintenance costs, evaluating and predicting reliability and availability of products, fulfilling and optimizing maintenance requirements.

Other works, however, approach the topic of installed base information management from a strategic perspective. Data generated by products during their lifecycle are unique resources that enable the augmented service offering, mitigating the increasing risks for the manufacturer that this kind of offering implies (Ulag & Reinartz 2011). Due to the risks mitigating effect, systems such as product condition monitoring technologies, that ease the collection of installed base information, can facilitate the transition to service-based business models such as *pay-per-use* (Greenough & Grubic 2010). In fact, extending the service orientation through more advanced and highly differentiating services entails risks due to "contractual obligations from the customers in terms of performance, availability and reliability" and increased costs for the delivery of such advanced services (Lightfoot et al. 2011). Manufacturers increasing service orientation poses challenges in cost estimation driven by the uncertainties that arise from performance-based contracts (Erkoyuncu et al. 2010).

In this context, the adoption of information and communication technologies to monitor assets remotely can inform and advance actions. Management of information collected from the installed base is fundamental to gain the visibility on installed equipment that is necessary to support effectively an augmented service orientation while real-time field data acquired from products are a main prerequisite for fully exploiting the service potential and develop new value propositions (Allmendinger & Lombreglia 2005; Holmström et al. 2010). Finally, information gathering capabilities about installed equipment is among the enabling factors of outcome-based contracts typically offered by firms with high level of service orientation (Ng & Nudurupati 2010).

Other research works focus their attention on tactical and operational benefits of installed base information management practices. Johnson & Mena (2008) define the information flow as a key process to successfully adopt a servitization strategy. In fact, information flow management links all the processes involved in the delivery of a servitization strategy using for example, real time data from the product, collected through condition monitoring and telemetry equipment. These data are key input for processes such as spare parts management and order delivery (Johnson & Mena 2008). In particular, a highly detailed installed base information obtained through incorporation of the geographic positions of installed equipment and the dynamics of their product life cycles enables a more timely and accurate forecasts of spare parts demand and returns (Dekker et al. 2011). Finally, the robustness of the service delivery process (i.e. the capability to respond to a large variety of service requests) can be increased with reliable service records and installed base data. Analysing past service operations classified by the equipment type provides statistical insight into the variety of different service requests and their requirements for material and technician skills (Agnihotri et al. 2002; Lehtonen & Ala-risku 2005).

As highlighted in the discussion of the research gap, an interpretative theory of the role of installed base information management practices in the servitization of manufacturing is still missing, therefore we adopt the theory of Knowledge Management to overcome this limitation of existent literature.

The knowledge-based theory of the firm suggests that knowledge is the organizational asset that enables sustainable competitive advantage in hypercompetitive environments (Alavi & Leidner, 2001). The knowledge-based perspective postulates that the services rendered by tangible resources depend on how they are combined and applied, which is in turn a function of the firm's know-how (i.e., knowledge). This knowledge is embedded in and carried through multiple entities including organization culture and identity, routines, policies, systems, and documents, as well as individual employees. Because knowledge-based resources are usually difficult to imitate and socially complex, the knowledge based view of the firm posits that these knowledge assets may produce long-term sustainable competitive advantage (Alavi & Leidner, 1999). Modern organizations make knowledge management (KM) an explicit part of their strategy in order to utilize the knowledge and experiences of individuals within the organization. KM is viewed as a broad concept that addresses the full range of processes by which an organization deploys knowledge (Burststein & Linger, 2003).

3. Literature review: knowledge management and servitization

3.1 Methodology

In order to answer to the research question reported in section 1, a two-steps literature review has been set.

In the first step influential papers associated with knowledge management (KM) have been identified through a bibliographic research carried out in several search engines, such as Google Scholar, Science Direct, Scopus, and Web of Science. The search provided a final list of eleven papers, of which eight journal articles and three conference proceedings focusing on the development and study of the KM theory. Years of publication range from 1999 to 2013. These papers were analysed to identify the characteristics that, in the authors' opinion, define a knowledge taxonomy, successful KM practices and knowledge management systems (KMS). These features have been transcribed into summary tables using the exact author's words, in order to prevent misinterpretation. The tables show the bibliographic

references, to maintain a connection to the source article. The classification structure evolved during the literature review: some categories were split into further and more detailed ones, while others features were merged in more comprehensive and general ones. This has led to a creation of a research framework grounded on theory aimed to analyse servitization literature through the lens of knowledge management (see section 3.2 for details).

The second step consisted in the application of the research framework to a set of papers focused on servitization and more generally on service business development. This allows to identify the conceptual relevance and guidelines for knowledge management as a lever supporting the servitization process of manufacturers. In the present paper are reported the preliminary results obtained from the analysis of four recent papers.

3.2 The Research Framework

The first step of the literature review has led to the research framework presented in Table 1. The table should be read starting from left to right, following a structure defined by four levels. Each font style is related to a level in the framework.

Table 1. The Research Framework grounded on Knowledge Management theory.

TOPIC	FIRST LEVEL	Second level	Third level
KNOWLEDGE	HIERARCHY	Data	
		Information	
		Knowledge	
	TACIT OR EXPLICIT		
	COLLECTIVE OR INDIVIDUAL		
KNOWLEDGE	OBJECT	Customer	
		Market	
		Financial	
KNOWLEDGE	OBJECT	Human resources	
		Product/service	
		Competitors	
KNOWLEDGE	TYPOLOGIES	Declarative	
		Procedural	
		Causal	
KNOWLEDGE	TYPOLOGIES	Conditional	
		Relational	
KNOWLEDGE	FEATURES	Free/ restricted access to information	
		Formal procedures/ informal network	
		Approach	Technological Economic Behavioural
KNOWLEDGE	FEATURES	Processes	Creation (socialization, externalization, internalization, combination) Storage/retrieval Transfer Application
KNOWLEDGE MANAGEMENT	CRITICAL SUCCESS FACTORS	Enabling learning People skills	
		Organization	Coordination Knowledge roles Top management commitment Centralization
		Measurement (to improve)	Knowledge assessment User satisfaction KMS quality
KNOWLEDGE MANAGEMENT	CRITICAL SUCCESS FACTORS	Enabling communication/sharing	Culture
		Alignment with strategy	Incentives
		Intellectual property	

TOPIC	FIRST LEVEL	Second level	Third level
KNOWLEDGE MANAGEMENT SYSTEMS	FEATURES	management	
		Environment	
		Financial resources	
		Interoperability	
		Size	
	FUNCTIONS	Data management	<i>Consistency</i>
		Aims	<i>Security</i>
		Communication	
		Document management	
		Coordination	
		Navigation	
		Database management	
		Search	
		Knowledge flow	
		Knowledge mapping	

Features contained in Table 1 are explained below.

3.2.1 Knowledge

According to Alavi, data is raw numbers and facts, information is processed data, and knowledge is information possessed in the mind of individuals: it is personalized information (Alavi & Leidner, 2001). The higher the level in the hierarchy the more structured the understanding required to recognize and comprehend the construct. As one moves up the hierarchy, there is an increasing level of “implicit meaning” or context embedded within the relations, patterns, and principles associated with the various levels. As the structure increases with higher levels of the hierarchy, relations, patterns and principles may confuse rather than inform or provide useful understanding or context. This is very important as time and effort can be wasted paying attention to useless noise rather than to critical information or knowledge (Nunamaker, Romano, & Briggs, 2001).

Knowledge can be either tacit or explicit. The tacit dimension of knowledge is comprised of both cognitive and technical elements. The cognitive element refers to an individual’s mental models consisting of mental maps, beliefs, paradigms, and viewpoints. The technical component consists of concrete know-how, crafts, and skills that apply to a specific context. The explicit dimension of knowledge is articulated, codified, and communicated in symbolic form and/or natural language (Alavi & Leidner, 2001). Tacit knowledge is difficult to extract from the human mind, thus limiting the manipulation and transfer of this type of knowledge. Accordingly, explicit knowledge has become associated with information (and information systems), and tacit knowledge linked to models and behaviours that are considered to aid its expression and transfer (Armistead & Meakins, 2002).

Knowledge can also be viewed as existing in the individual or the collective. Individual knowledge is created by and exists in the individual whereas social knowledge is created by and inherent in the collective actions of a group (Alavi & Leidner, 2001). If managers focus on the knowledge held by individuals they will encourage opportunities for individual learning but potentially at the expense of the needs of the collective knowledge. A concentration mainly on the latter, however, could restrict the creative learning of individuals (Armistead & Meakins, 2002).

The object of knowledge could be external, and thus comprises client information, competitive information, customer information and market information, or internal, and thus comprises activity-based costing, financial information, human resources information and product/services information (Alavi & Leidner, 1999).

Finally, different knowledge typologies were identified: declarative (know-about or knowledge by acquaintance), procedural (know-how), causal (know-why), conditional (know-when), and relational (know-with) (Alavi & Leidner, 2001).

3.2.2 Knowledge management features

Some organizations are associated with formal structure (hierarchy), which suggests that access to some knowledge might be restricted, whereas in other organizations individuals have more informal access to knowledge (Armistead & Meakins, 2002).

The “personalization strategy”, as named by Hahn, recognizing the tacit dimension of knowledge, assumes that knowledge is shared mainly through direct interpersonal communication. On the other hand, the “codification strategy” assumes that knowledge can be effectively extracted and codified and thus uses a document-to-person approach where knowledge artefacts are then stored and indexed in databases that enable easy retrieval (Hahn & Subramani, 2000).

The processes involved in knowledge management are: creation, storage/retrieval, transfer and application. Four modes of knowledge creation have been identified: socialization, externalization, internalization, and combination. The socialization mode refers to conversion of tacit knowledge to new tacit knowledge through social interactions and

shared experience among organizational members (e.g., apprenticeship). The combination mode refers to the creation of new explicit knowledge by merging, categorizing, reclassifying, and synthesizing existing explicit knowledge (e.g., literature survey reports). Externalization refers to converting tacit knowledge to new explicit knowledge (e.g., articulation of best practices or lessons learned). Internalization refers to creation of new tacit knowledge from explicit knowledge (e.g., the learning and understanding that results from reading or discussion) (Alavi & Leidner, 2001).

The approach to knowledge management could be defined as: "technocratic", i.e. based on information or management technologies, which largely support and, to different degrees, condition employees in their everyday tasks; "economic", i.e. the most commercial in orientation, explicitly creating revenue streams from the exploitation of knowledge and intellectual capital; "behavioural", i.e. stimulating and orchestrating managers and managements to be proactive in the creation, sharing, and use of knowledge as a resource (Earl, 2001). According to Armistead, technology can be used alone or in combination with people at an individual or organizational level. Managers do not believe technology could wholly replace people, or that there is no place for technology in approaches to knowledge. The majority of the companies considered that although the role of technology is influential, it is ultimately a facilitator of human knowledge in the organization (Armistead & Meakins, 2002).

3.2.3 Knowledge management critical success factors

KM critical success factors emerged from the literature analysis are as follows:

- It must be stated that even good KMS are not productive if they do not align with business objectives. Knowledge manager's awareness about strategic priorities, perception of top management of KMS role in supporting business strategies, learning senior managers about importance of KM, applying Knowledge initiatives to strategic changes, and evaluation of strategic importance of KMS are main criteria to evaluate the level of alignment (Mehregan, Jamporazmey, Hosseinzadeh, & Aliyeh, 2012).
- According to Lee, learning and development are important, thus successful knowledge management practices should enable organizational learning (Lee & Choi, 2003).
- Organization has a strong influence on knowledge management outcomes. The first step is establishing new knowledge roles: create a separate organizational unit, create positions or roles responsible for knowledge-related tasks, such as knowledge broker or knowledge engineer, and assign personal responsibility for knowledge (Maier & Remus, 2001) (Alavi & Leidner, 1999).
- Leadership has been recognized as a factor influencing the conduct of KM. This success factor is related to providing the managerial atmosphere that encourages KM initiatives by members of the organization, and providing adequate resources for the KM/KMS initiative (Mehregan, Jamporazmey, Hosseinzadeh, & Aliyeh, 2012) (Holsapple & Joshi, 2002).
- People are one of the most important enabler in knowledge management. There are many factors which are related to people such as personality, cognitive style, self-efficacy, and skills (Lee & Choi, 2003).
- The success of knowledge management practices depends also on the capability of the organization to enable sharing and communication. Maier suggests creating a (virtual) work environment which enables the sharing of tacit knowledge: the issue is to create virtual workspaces, networks of knowledge workers which provide an alternative environment to the co-located workspace, thus enabling the sharing of tacit knowledge (Maier & Remus, 2001).
- In her case study, Alavi reported that managers expressed the need for metrics upon which to demonstrate the value knowledge management. Initiatives should be directly linked to explicit and important aspects of organizational performance (e.g., customer satisfaction, product/service innovations, time to market, cost savings, competitive positioning, and market shares) (Alavi & Leidner, 1999).

3.2.3 Knowledge management systems features

A characteristic describing a knowledge management system is its size. For example, the greater the number of documents in the document repository or the intranet, the higher the chances one would be able to find documents of interest. However, even though greater network size may increase the potential reach of an electronic discussion forum, greater network size would tend to increase information overload. This increases the amount of effort required to follow the discussions. However, if the size of the network is too small, the network may offer insufficient resources (Hahn & Subramani, 2000).

Applications of IT to organizational knowledge management initiatives reveal these common applications: (1) the sharing of best practices and the access to information for IT support functions, (2) the creation of corporate knowledge directories, and (3) the creation of knowledge networks, bringing geographically dispersed workers together to collaborate on team tasks, (4) support for phone-based help desks and (5) reusing and learning from knowledge acquired during previous IT efforts (Alavi & Leidner, 2001) (Nunamaker, Romano, & Briggs, 2001).

Other relevant features are suggested by Alavi: interoperability of existing data systems, security of data on Internet, ensuring customer confidentiality, eliminating wrong/old data and keeping the information current (Alavi & Leidner, 1999).

3.2.4 Knowledge management systems functions

An important function of KMS is communication. Interpersonal contacts enabled by the system results in knowledge sharing and transfer. Instances of such systems include electronic discussion forums where employees may post questions to which other employees with answers or suggestions can post replies. Threaded discussions and e-mail distribution lists are typical technologies used in systems in this class (Hahn & Subramani, 2000). Other systems are desktop video and real-time data conferencing (Synchronous) and non-real-time data conferencing (asynchronous) (Nunamaker, Romano, & Briggs, 2001).

A second function is document management; this factor consists of these criteria: storage, disseminating, searching, document control and reuse. An example is constituted by knowledge repositories (knowledge element management systems): document management systems with added features e.g. with respect to classification and structuring of knowledge elements or with respect to searching with sophisticated filters, user profiles etc. (Maier & Remus, 2001).

Coordination systems are useful in organizing group knowledge and work. Examples include group calendaring and scheduling, electronic meeting systems, workgroup utilities and development tools, groupware services and applications and collaborative Internet-based applications and products (Nunamaker, Romano, & Briggs, 2001).

Another function is navigation: according to Earl, the principal contribution of IT is to connect people via intranets and to help them locate knowledge sources and providers using directories accessed by the intranet. Extranets and the Internet may connect knowledge workers to external knowledge sources and providers (Earl, 2001).

Alavi underlines the importance of advanced computer storage technology and sophisticated retrieval techniques, such as query languages, multimedia databases, and database management systems, can be effective tools in enhancing organizational memory. Document management technology allows knowledge of an organization's past, often dispersed among a variety of retention facilities, to be effectively stored and made accessible (Alavi & Leidner, 2001).

A further function is constituted by intelligent agent technology to filter out irrelevant content and locate potentially useful conversations on Internet relay chat (IRC). The agent builds a profile of the user through a keyword-based model and recommends current chat sessions by sampling IRC channels to find current conversations that match the user's profiles. Employees are required to append appropriate keywords and meta-data to their documents prior to the uploading to the document repository or to fill out extensive skills and expertise questionnaires (Hahn & Subramani, 2000).

IT can also enhance the speed of knowledge integration and application by codifying and automating organizational routines. Workflow automation systems are examples of IT applications that reduce the need for communication and coordination and enable more efficient use of organizational routines through timely and automatic routing of work-related documents, information, rules, and activities. Rule based expert systems are another means of capturing and enforcing well specified organizational procedures (Alavi & Leidner, 2001).

The last proposed application is concerned with knowledge mapping. This activity can be conducted through text mining techniques and techniques for representing knowledge sources (people and information) in a context defined by their relationships reached through clustering, classification and visualization of documents (e.g. IBM Intelligent Miner) (Maier & Remus, 2001). A database of experts is an instance of such a system. The contents of the KMS are created by employees filling out a questionnaire to describe their level of expertise in a predefined list of skill categories (e.g., Java programming, project management, vibration dampening, etc.). The Experts database is intended to be useful for users to locate people with specific skills in domains where the user has a problem to contact them for help (Hahn & Subramani, 2000).

3.3 Findings: the knowledge management framework

In this chapter the research framework presented in previous section is used to identify knowledge management practices necessary to develop a successful service business. The framework is applied to a list of papers focused on service business development and presented in Table 2.

Table 2. List of papers used to apply the Research Framework.

FIRST AUTHOR	TITLE	YEAR
Baxter	A knowledge management framework to support product-service systems design	2009
Grant	Capturing and measuring technology based service innovation – A case analysis within theory and practice	2013
Kowalkowski	ICT as a catalyst for service business orientation	2013
Rämänen	Human role in industrial installed base information gathering	2013

The application of framework comprised the carefully reading and analysis through tables of the papers. All the relevant KM practices were transcribed and compared to the features described in the framework, in order to assess if there was an actual correspondence. In Table 3 a synthesis of the results is presented.

Table 3. Result of research framework application to selected servitization papers (*= dimension added to the original Research Framework in order to consider specific application of the KM practices in a servitized context).

TOPIC	FIRST LEVEL	Second level	Results
KNOWLEDGE	HIERARCHY		All authors use the terms “data” and “information” as synonymous, with no regard to hierarchy.
	OBJECT	Customer	Data about customer satisfaction on product and services are seen as relevant as input of a feedback system that aims to continuously improve products and services.
		Product/service	In all the papers the importance of Installed Base Information is stressed; it comprises all technical and commercial data related to installed base and needed for operation or optimization of industrial services. Typologies of data collected from the Installed base are: product technical and spare parts history, degree of utilization (working hours, number of working cycle, etc.), geographical position, product modes of use, functioning parameters (temperature, vibration, etc.), resource and consumable consumption. Sensors provide technical data via remote monitoring, but some data have to be collected manually. This manually collected data typically include operational and cost related data from service operations, such as hours spent at the site and spare parts used (Rämänen et al., 2013).
	TYPOLOGIES	Declarative	In a technical PSS, detailed descriptions of design, manufacturing and service are required. Baxter proposes a knowledge-based system, where the central class ‘life cycle system’ is principally comprised of three classes: product, process and resource. The system also comprises various descriptive classes: requirements, behaviour, logistics, operating methods, and installation environment. Examples of service features include uptime, response, and capability to quickly address problems. The product class is comprised of architecture and requirements (Baxter et al., 2009).
		Procedural	In Baxter’s knowledge-based system proposal, the process class is comprised of activities and resources. This is developed in line with the Process Specification Language (PSL) core, which defines processes in terms of activities, objects and time points. Time is a requirement for process execution, however is has not been included as part of the proposed framework. The resource class, in a similar manner to the PSL ‘object’ class, refers to any resource that is used by a process. Resource subclasses include facilities (e.g. manufacturing; service), equipment (e.g. tools; office equipment), person, and material and information resource. The information resource class contains drawings, standards, detailed machining features, tolerance data, materials data, and others (Baxter et al., 2009).
		Causal	Indication of failure cause is necessary for a full appraisal of a product failure. ‘Failure cause’ is not a simple issue. There is some risk associated with service technicians assigning root cause to product failures, since the cause is not always clear from the symptoms. In Baxter’s case study, for every product service carried out, symptoms are recorded but root cause is not investigated. For every warranty claim, an investigation is carried out to identify root cause in order to assign the cost of repair. Where unusual or repeat failures occur, detailed investigations are carried out at the customer site by applications specialists to identify and rectify the root cause and improve system performance. Data from all three types of investigation, including the reports produced and the photos taken during machine disassembly, should be available to the design team in case they want to investigate any given product failure in more detail.

TOPIC	FIRST LEVEL	Second level	Results
KNOWLEDGE MANAGEMENT	FEATURES	Approach	<i>Technological:</i> information systems are required to manage Installed Base Information. Examples are ad hoc system developed in-house (e.g. spreadsheets, Access database, etc.), ERP, CRM (Customer relationship management), PDM (Product data management), PLM (Product lifecycle management)
			<i>Behavioural:</i> although a trend to replace humans with sensors as the diagnostic element has been widespread, certain elements of the failure diagnostic process cannot be easily handled without the presence of human actors. Sensors only provide discrete data regarding variables (e.g., temperature) that can indicate failures but human observation is needed to form a deeper understanding of the failure cause (Rämänen et al., 2013).
		Processes	<i>Creation (socialization, externalization, internalization, combination):</i> The focus is, in particular, on combination process, which is referred to as “integration”. Rämänen in fact affirms that it is important to have a system that effectively integrates the information pieces received from the different data collector groups so that the information is easily utilizable in different business functions (Rämänen et al., 2013).
			<i>Storage/retrieval:</i> IBI can be derived from various information systems (manufacture, sales, etc.) (Rämänen et al., 2013).
			<i>Transfer:</i> IBI can be collected automatically through sensors (remote monitoring) or manually (Rämänen et al., 2013).
			<i>Application:</i> IBI plays an essential role in a number of functions. Firstly, this information can serve as a key source for making correct and accurate preventive maintenance plans. Furthermore, sales personnel may utilize up-to-date IBI as they make decisions on where to sell modernization packages or new substitutive equipment. Correct and timely information can also be invaluable in order to provide customers with the best possible service level. For instance, one of the companies involved in Rämänen’s research uses IBI to optimize the operation of equipment installed in their customers’ site (Rämänen et al., 2013).
	CRITICAL SUCCESS FACTORS	User skills	Insufficient training and deficient data collection guidelines can negatively affect the quality of manual data gathering. Problems can also occur due to people’s manifold interpretations of complex equipment involved in the data collection. Elaborate, comprehensible and uniform data gathering training and guidelines should be provided to all workers that are or could be involved in the IBI gathering process (Rämänen et al., 2013).
		Organization	<i>Knowledge roles:</i> 1) Dedicated data collectors. By dedicated data collectors is meant persons whose primary task on a site is to collect IBI. However, they may also have other off-site work duties. The practices of having dedicated information gatherers may vary depending on, e.g., the country. These workers have no other tasks that would interfere with information gathering so they can fully concentrate on it and they have enough time to do the task well. What comes to motivation for collecting good quality information, it is likely to be naturally high because the evaluation of the worker performance is based on the quality of information gathering. 2) Workers with other primary tasks. They include all workers that, in one way or another, perform work tasks with the installed base but whose primary work tasks do not include IBI gathering. This group includes skilled technicians and the manufacturer’s maintenance staff. These persons could collect IBI alongside their primary work tasks while they are at the site. 3) The customer needs to gather and provide information, such as usage data, environment information and location data, to enable value added services provided by the manufacturer or a third party service provider. The data collector group of customers encloses a variety of different people working for the customer, which means that people with varying job roles are involved.

TOPIC	FIRST LEVEL	Second level	Results
			<p>4) Equipment users. By equipment users Rämänen refers to ordinary citizens who have no particular tie to the company at issue but who use the products or services provided by the company. Whether companies have users amongst ordinary citizens depends on the product and service offering of the company. Among industrial companies this is less common compared to companies providing consumer products and services, but these kinds of companies do exist. If an industrial company has users among ordinary citizens, these equipment users can, in practice, provide the company with IBI. In his research, Rämänen has used the term industrial crowdsourcing when discussing ordinary citizens as IBI gatherers. The job can be performed either collaboratively by many people or by single individuals.</p> <p>5) In certain business domains, it is possible that external inspection agencies gather information regarding the installed equipment while they are making inspection reports. They may also have own databases where this equipment information is being stored. Hence, these authorities can be considered as one potential source of IBI. According to Rämänen company contacts, a representative from the own personnel can also sometimes be sent to accompany the person from the inspection agency, which provides an opportunity for gathering IBI.</p> <p>6) Insurance companies collect IBI and use it in estimating risks. They also provide information to their customers when pointing out risks in customer operations. Vice versa, if customers can show that they manage their risks, for example, by collecting and analysing IBI, insurance companies may be willing to lower insurance payments due to lower risk levels (Rämänen et al., 2013).</p> <p><i>Top management commitment:</i> The quality of data can also be negatively affected by poor management structures that do not promote accuracy, completeness and timeliness of data reporting. Management's commitment to data quality as well as data quality awareness are important factors in the pursuit of high-quality data. The importance of effective management and operator feedback as well as fluent communication amongst involved stakeholders has been also brought up (Rämänen et al., 2013).</p>
		Measurement	<p><i>User satisfaction:</i> the knowledge contributors require motivation to spend time populating the system. Both manufacturing and service managers aim to keep data recording to a minimum. Therefore two important aspects contribute to this motivation: minimal time required for inputting data, and maximum potential for the system to support the activities of the knowledge provider (Baxter et al., 2009).</p> <p>Usability of the tools used for entering information affects both the quality and quantity of provided information. Bad usability causes confusion and leads to mistakes when providing information as well as leads to frustration and reduces motivation to provide data (Rämänen et al., 2013).</p>
		Enabling communication / sharing	<p><i>Incentives:</i> Firstly, motivation towards data gathering is low if data collectors do not consider data gathering as being part of their job. Data collection can also be considered as additional paperwork, hence not being fascinating. Further, data collectors may feel incompetent what comes to data gathering, and therefore be unwilling to participate. Lastly, some workers may fear that the gathered data could somehow be used against them, which makes them reluctant to collect data. Also, the important role of education regarding the importance of good quality data has been highlighted. The person gathering the information may not benefit from the use of that information which can result in a diminished motivation to collect data. In the case of the group of workers with other primary tasks, Baxter has found out that integration with other work tasks is crucial. Workers are not motivated to perform an additional task if it causes significant deviation to their current workflow. According to Baxter's findings, the motivation for information gathering can be generated through at least three alternative ways. Firstly, direct monetary compensation or some other kind of reward (e.g., vouchers) can be used to whet</p>

TOPIC	FIRST LEVEL	Second level	Results
			workers' appetite for gathering information. Secondly, information gathering may bring intangible benefits for the information collector, which can positively affect attitude and motivation. An example of such benefits is something that eases the person's other tasks. The benefit can either result directly from the worker's actions regarding information gathering, or another party can grant the worker certain benefits as a reward. Lastly, the workers' motivation may be improved by promoting the meaningfulness of information gathering through effective communication, hence making workers feel themselves important (Baxter et al., 2009).
		Alignment with strategy	Managers should have in mind that a strategic move to increase service business orientation through investments in ICT requires a business rationale and strategic congruence as well as the critical resources and capabilities needed (Kowalkowski, Kindström, & Gebauer, 2013). Firms with high Service orientation have a higher maturity level in terms of installed base information management practices due to a wider breadth of data collected from their installed base and implementation of more specialized and integrated information systems to manage this information, and experience a wider number of benefits from this kind of practices.
		Environment	Regarding the potential effects of work environment and the nature of work tasks, it has been suggested that operator time pressures are likely to affect the quality of collected data (Rämänen et al., 2013).
	FEATURES	Size	The set of information that is truly needed needs to be defined. We claim that it is not reasonable to collect large amount of information just in case it might be utilized at some point - the true usefulness of most of it may end up being debatable. Smaller set of information also increases the likelihood of actually getting all of the needed information (Rämänen et al., 2013).
		Data management:	<i>Consistency:</i> In certain service business domains, equipment turnover in the service base can cause problems with keeping IBI up-to date. When a service contract is lost to a competitor, the visibility to the equipment is lost. During that time the competitor may make changes to the equipment, and when the service contract is at some point won back the IBI at hand may be outdated. Therefore, trying to find means for keeping the IBI up-to-date is of great importance (Rämänen et al., 2013)
		Aims	ICT is an important asset for creating superior customer value based on explicit service quality, proactive and integrated solutions as well as timely, empathic design of new services. According to previous research, new services can be introduced more rapidly into the market when having a significantly better control over the IT infrastructure. Controlling the IT infrastructure is necessary for building a service system and enhancing service quality excellence. Hence, ICT enables better service delivery and leads to improved cross-functional communication and service-oriented business strategies (Kowalkowski, Kindström, & Gebauer, 2013).
	FUNCTIONS	Communication	1) The adoption of information and communication technologies to monitor assets remotely. Due to the risks mitigating effect, systems such as product condition monitoring technologies, that ease the collection of installed base information, can facilitate the transition to service-based business models such as pay-per-use. 2) Mobile devices for service employees. Such initiatives involve relatively low risks, do not require a comprehensive understanding of the technology among top management, and the cost reductions allow a rather straightforward and measurable return on investment. Since 2002, in Toyota Material Handling Europe, the service organization is using a mobile business system and service technicians are using handheld computers to receive and report work orders and access customer fleet data and spare parts information. In this way, value can be created by offering process analysis and consulting services. Customers can view the real-time utilization of their fleet and see how the trucks are driven, set driver access and shock levels remotely, and manage all production sites centrally. (Kowalkowski, Kindström, & Gebauer, 2013).

TOPIC	FIRST LEVEL	Second level	Results
		Document management	Direct billing and transaction-efficient service order handling (Kowalkowski, Kindström, & Gebauer, 2013).
		Search	Baxter defines a scenario, in his case study, where designers have to access machining capability data. Designers reported that the system provides too much irrelevant information, that they had to 'drill down' through too many levels to access to the data relevant to them, and that this would prevent them from accessing the system. This recognizes that with an increasing amount of content available in a knowledge management system, there is a requirement to ensure that people are able to access knowledge relevant to their work function. The approach taken to ensure that appropriate knowledge can be delivered is to provide an activity level mechanism, which links knowledge resources with activities. The precise mechanism is the inclusion of a 'knowledge resource' slot in the activity class. This slot enables any instance from any class in the knowledge base to be associated with an activity. Whilst the system limits the content of the knowledge resources to alphanumeric inputs, the class structure supports the extension of the principle to include hypermedia links, attached files, and links to other systems (Baxter et al., 2009).
		Knowledge flow	The information flow is a key process to successfully adopt a servitization strategy. In fact, information flow management links all the processes involved in the delivery of a servitization strategy using for example, real time data from the product, collected through condition monitoring and telemetry equipment. These data are key input for processes such as spare parts management and order delivery. In particular, highly detailed installed base information obtained through incorporation of the geographic positions of installed equipment and the dynamics of their product life cycles enables a timelier and accurate forecast of spare parts demand and returns.
APPLICATIONS *	DESIGN SUPPORT		<p><i>Product design:</i> One important element of design knowledge capture, particularly in the design of mature products, is process modelling. A prescriptive design process model shows the best practice sequence of tasks which contribute towards the creation of the final product. The process is divided into two main stages: conceptual and detailed design. The conceptual design activity begins with the creation of a project team. In parallel, the requirements specification, product family definition, module structure definition and service package design activities are carried out. The recognition of an integrated product and services sales strategy brought about the requirement to design the service package concept at this early stage. this model proposes a manufacturing analysis activity to take place within the conceptual design stage in order to verify the commercial validity of the project. The requirements specification activity is one of the first activities to take place in the design project. The purpose of the activity is to identify and document the requirements in order to develop an engineering specification for the product or system. Concurrent activities include product family definition, module definition (defining the strategy for common modules across the range), and service package design (the outline strategy for service delivery).</p> <p>In the knowledge base, the requirements specification activity includes various knowledge resources, including requirements specifications from previous products. The detailed reference to the requirements specification from previous projects supports the design team in developing specifications for the new design project where they are not explicitly indicated by the market analysis activity by giving them a clearly defined starting position. Various personnel are involved at this stage, including engineering, manufacturing, marketing, sales, and customer application specialists (Baxter, Roy, Doultsinou, Gao, & Kalta, 2009).</p> <p><i>Service design:</i> The first activity relates to defining the product. Inputs from the knowledge framework include the product architecture class (BOM, modules) and inputs from the resource class (e.g. drawing). The product description is likely, in practice, to represent a family of products with multiple variants. A further critical</p>

TOPIC	FIRST LEVEL	Second level	Results
			element is the intended customer application, defined using the 'installation environment' class. This includes references to resources including equipment and personnel. This process will have been evaluated by service personnel at the prototype stage. In combination with the projected volume, this input is applied to the development of the service process. Activities and resources (personnel, information, tooling) required by the process are compared against the existing facility. Tooling, training, and test procedures are developed according to the existing facility, in line with the volume of products expected (Baxter, Roy, Doultsinou, Gao, & Kalta, 2009).
	SERVICE SUPPORT		<p>There is a wide range of generic SSP that are enabled and facilitated by ICT, for example remote monitoring and control, product utilization report packages, preventive maintenance agreements, and fleet management systems. As more and more information about product usage is possible to collect wireless in real time, firms have a more accurate foundation for proactive, higher-quality maintenance and operational services. ICT enables the development of new SSP but these are not necessarily new stand-alone services. Customer benefits enabled by SSP, such as reduced operational costs through process automation, better predictability, and information on product performance and usage in customer operations, lead to more attractive value propositions (Kowalkowski, Kindström, & Gebauer, 2013).</p> <p>Baxter provides examples of knowledge management systems supporting service such as spare parts and training and feedback from service to design. Spares are a designation for components available to the after-market as replacement parts. Spares definitions may dictate that certain parts replacements are carried out in groups. For example, a single seal may only be available as part of a kit. That kit may include several washers, seals 'o'-rings or gaskets, according to the expected requirement for a full or partial rebuild. Other rebuild parts kits may also be available, containing various wear parts according to the recommendation for parts which should be replaced as part of every product rebuild.</p> <p>Training refers to the requirements for procedures and documentation as well as project planning to support product launch. Documentation describing service and maintenance procedures is a key part of the training requirement. Hands-on training also takes place: a service technician trained by the NPI team may travel to the various service centres to train key personnel, or service technicians from the various global sites may travel to a central location to receive hands-on training.</p> <p>Serviceability is indicated through feedback from service personnel to designers. Feedback may include actual time taken in the service process, problems encountered, ideas for improvement, and design change requests. (Baxter, Roy, Doultsinou, Gao, & Kalta, 2009).</p>

4 Conclusion

Although the research attention towards servitization has been very high in recent years, the role of installed base information management as an enabler of this transformation of manufacturers has not been approached comprehensively. This paper presents a preliminary work meant to support the development of a theory about this topic. To do so, we addressed the role of installed base information for the provision of PSS through the lens of Knowledge Management theory.

The contribution of this paper is therefore twofold. First, a research framework was developed based on the knowledge management literature, which identifies the characteristics of three entities: i.) Knowledge; ii.) Knowledge management; iii.) Knowledge management systems.

Second, this framework is tested by applying it to four papers dealing with knowledge and successful service business development in manufacturing. This generates a preliminary understanding of knowledge management features in the servitization process, which are listed in Table 4.

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Remember to identify what your service network partners value

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The traditional view of value in exchange has increasingly shifted to value in use where the customer and provider interact in long-term relationships by sharing and integrating resources. In addition, the outsourcing of industrial services (e.g. maintenance services) has increased inter-organizational co-operation and networking in many companies. This has created a need for models and tools to identify what the different partners value in the service. The specific objective of this paper is to present a conceptual framework for a collaborative value analysis model built to identify what the network partners value in industrial services. The framework is based on a systematic literature review considering value analysis models in the business-to-business context. In the previous research, the value discussion has been mainly about customer perceived value and relationship value. Service provider value has garnered scant attention. Our framework aims to present a collaborative model, which considers multiple operators in the industrial service network: the customer, the service providers and the equipment providers. To make business networks successful, the company partners need common goals and expectations, the value of all network members should be taken into account. The paper contributes to industrial service decision making by providing a conceptual framework for collaborative value analysis based on research gaps identified in the previous literature.

1 Introduction

Value creation is the essence of service relationships (Lindgreen & Wynstra 2005; Möller 2006; Vargo & Lusch 2008; Walter et al. 2001). In order to be able to create value, the partners need to identify the value of the service. This paper presents an overview of different value analysis models employed in B2B services, based on a systematic literature review. We use the term model to mean implementations (e.g. frameworks, equation models and conceptual models) that can be used for decision making, and should also be independent of a single case. Based on the identified models and the literature, a conceptual framework for collaborative value analysis with a specific focus on maintenance services is presented.

Better integrated and more knowledge intensive solutions provided for industrial service customers, and the outsourcing of support services, has increased the inter-organizational collaboration between many companies operating in industrial maintenance and other service networks (Kremic et al. 2006; Redondo-Cano & Canet-Giner 2010). Ford & McDowell (1999) state that the network context is highly complex and this hampers, for example, marketing and purchasing management. This emphasises the need for collaborative value analysis, cost analysis and pricing models to identify what each partner values in the service relationship and support decision making. Many of the extant value analysis models do not take the new collaborative context into account, so updated models are needed to improve decision making between network partners and strengthen the relationship and trust (e.g. Ahonen et al. 2010; MacCarthy & Jayarathne 2012; Panesar & Markeset 2008; Werner Reinartz 2008; Sinkkonen et al. 2013).

Maintenance has shifted from what could be described as a necessary evil to being a part of the business which creates additional value (Parida & Kumar 2006). The current literature supports the value of maintenance services, which e.g. for customers can be surprisingly high (e.g. Komonen 2002; Sinkkonen et al. 2013; Al-Turki 2011). Especially if the customer operates in the process industry and insufficient resources are put into maintenance, this can result in major losses through lost production (Knapp & Mahajan 1998). In addition, maintenance is highly case specific due to the different strategies employed to maintain critical and non-critical systems. Increasingly complex assets have grown knowledge intensity and attracted specialisation in the field (e.g. Al-Turki 2011). The value of maintenance comprises both tangible and intangible value elements (Ali-Marttila et al. 2013; Ojanen et al. 2012; Toossi et al. 2013).

The strategic importance of maintenance has increased the number of inter-organizational partnerships and led to the creation of more maintenance networks. These comprise customer companies, i.e. maintenance purchasers, and a variety of supplier companies such as maintenance service providers and equipment manufacturers (Marttonen et al. 2013). Maintenance operations are often at least partly outsourced (Ali-Marttila et al. 2013). We know that maintenance can create additional value and that the nature of the business has changed; maintenance service suppliers are now an important part of the landscape. But service-dominant logic that says value is created throughout the relationship not just in the exchange has to date received less attention (Vargo & Lusch 2008). The importance of the price of the service is often still emphasised, although especially for complicated services functionality should be the deal breaker. In addition, due to case specific contracts, it is essential to know the specific value elements for each case. To engage in true collaborative relationships, the value elements of the service provider should be considered. Also collaborative value analysis is needed in order to be able to improve the service networks and make them successful.

The concept of modelling the key elements and dimensions that constitute value creation in maintenance service relationships and overall in B2B relationships has attracted relatively little research interest (e.g. Corsaro & Snehota 2010; Ulaga & Eggert 2006). But the B2B marketing literature is already further ahead in considering service value and relationships than the maintenance literature (e.g. Aarikka-Stenroos & Jaakkola 2012; Grönroos & Helle 2010). In order to gain insights from the marketing literature, the extant literature is systematically analysed to identify the current models employed for value analysis in B2B services, and to see how they have been used. Based on the findings and by taking into account the special characteristics of industrial maintenance services, a conceptual framework for a model to identify the value elements of the network partners is proposed.

Our research questions are:

- What kind of value analysis models have been presented in academic journal publications relating to B2B services?
- What kind of building blocks for the collaborative value analysis framework can be identified in the extant literature?
- What elements should the collaborative value analysis model of industrial services include?

The current models do not consider all the partners in service networks. In order to improve the competitiveness of the service relationships, the partners need to understand what elements create value in the service for each member. We contribute by providing a conceptual framework for collaborative value analysis to support decision making. Collaborative tools are needed to improve network level co-operation between members in maintenance and other services. Appropriate models and their implementation strengthen the networks and help them compete with others.

The paper is structured as follows. First, the relevant value theory is described. Then the methodology of the literature selection is described in detail, after which the selected literature is analysed and the framework presented. Finally, the conclusions and avenues for future research are presented.

2 Value creation in business relationships

Payne et al. (2008) explains that the value creation process in business relationships comprises what value the customer receives, what value the service provider receives, and how the partners can manage the value exchange successfully to maximise the received total value. Although this sounds clear, the value has multiple dimensions and the value literature has focused significantly on exploring what the dimensions and drivers are that create value in business relationships (e.g. (Corsaro & Snehota 2010; Menon et al. 2005; Ulaga & Eggert 2006)).

Customer value is generally defined as the trade-off between the benefits and sacrifices (or cost) in an exchange (Ulaga & Eggert 2006; Zeithaml 1988). The benefits can include, for example, quality or cost savings, and price can be seen as a sacrifice (Dumond 2000; Grönroos 2011). In this paper, in analysing the identified models we consider customer value a value perspective that discusses only the value and benefits relating to what the customer gains from the service relationship.

The marketing literature has focused predominantly on customer value, so supplier value is studied markedly less (e.g. Purchase et al. 2009; Ramsay & Wagner 2009; Walter et al. 2001). Purchase et al. (2009) and Ramsay & Wagner (2009) describe supplier value as the benefit the supplier receives when interacting with the customer. The benefit can be, for example, profit or new customers. We see supplier value as a perspective where only the benefits from the supplier are considered.

The traditional value-in-exchange view (goods-dominant logic) has been challenged by value-in-use (service-dominant logic). Value is not only created with the object of exchange (e.g. product, service offering), but also in the whole value delivery process during which resources, skills and knowledge are shared when the customer and supplier interact (Lindgreen & Wynstra 2005; Payne et al. 2008; Vargo & Lusch 2004). In industrial services, the value delivery process can last for several years through long-term contracts. In persistent relationships, value is also created through interactions over time because the customer and provider continuously learn from each other as the relationship develops (e.g. (Ford & McDowell 1999; Hammervoll 2012). Relationships create synergies that benefit network partners, and thus can be considered to have value for both the customer and service providers (Smals & Smits 2012; Ulaga 2003).

The value of the relationship can take in factors such as reputation, the innovativeness of the supplier, and access to networks of partners (Möller & Törrönen 2003; Walter et al. 2001). Thus, companies must consider also other elements that create value in business relationships rather than just the current offering (Ravald & Grönroos 1996; Lindgreen & Wynstra 2005). This has shifted the broader focus of value research from individual transaction processes to the ongoing interactions between the firm, its customers and network partners over time (Payne & Holt 2001).

The value experienced in relationships can be both tangible and intangible, and derived from multiple dimensions such as increased profits, increased reputation, access to new partners, and trust (e.g. (Baxter & Matear 2004; Biggemann & Buttle 2012; Grönroos 2011; Ulaga & Eggert 2006). However, partners in the same relationship might have different perceptions of the elements that create value (Corsaro & Snehota 2010). In order to be able to discuss and gain a mutual understanding of the created value and improve the value creating elements, what each partner values in the service and relationship should be identified (e.g. Aarikka-Stenroos & Jaakkola 2012). In this paper, we see the

relationship value perspective as one where the value of two or more parties is considered and value is created in collaboration.

While actively involving suppliers in the value creation process can increase value creation potential, it can also make the partners increasingly dependent on each other, as Möller (2006) points out. Therefore, striving for value creation through relationships is not always the best solution. In this paper, however, we focus especially on situations where industrial service networks are created, and supplier, customer and equipment provider are actively involved in the value creation process. The research has not been able to keep pace with changes in the industry, so this paper provides a conceptual framework to identify the value elements of industrial maintenance service partners, and thereby to support decision making in industrial service networks.

3 Methodology for the literature selection

A systematic literature review was conducted to study the current value analysis models for B2B services that can be found in the academic journal publications. This section presents the literature sample selection process in more detail.

As we wanted the literature sample to include articles that consider value analysis models used in the service context, we defined three main categories – value, models and services – for keywords used in the search strings (Table 1).

Table 1. Keywords used in the search strings.

1 Value	2 Model	3 Service
value	model*	"business service"
	tool	B2B ¹ service
	framework	"industrial service"
	method	"maintenance service"

¹also business-to-business

All the category keywords are quite common so more specifications were applied in order to work through the material in reasonable time. The first category, and the keyword *value*, goes to the heart of this study and is therefore included in all search strings. The second category focuses on the modelling aspect and includes the specific keywords *model*, *tool*, *framework* and *method*. They are all constructs for decision making and to cover the analysis process adequately should be included in the search strings as well. In addition, different keywords should be employed to identify the appropriate models, because for example some argue that model and method are often used interchangeably. The third category is for services and contains the keywords *business service*, *B2B service*, *industrial service*, and *maintenance service*. "Business service" can be considered the most upper case, and the other services come down to more specific fields and finally to the specific theme of this paper, namely "maintenance service". Thus the models identified in the literature sample must include also the service aspect.

Keywords were then combined from each category into 16 (1x4x4) search strings that were applied to the databases. Since Scopus (Elsevier) and ISI Web of Science (Thomson Reuters) may be considered both leading and competing databases in business research, they were employed to ensure the availability of a large, comprehensive literature pool (e.g. Gavel & Iselid 2008). We collected the literature sample in July 2014 and no time distribution limitations were set for the search.

In order to find the relevant articles, the following criteria based on Newbert (2007) were applied when considering the inclusion or exclusion of a paper:

- Include only peer reviewed scientific journal articles
- Ensure relevance by selecting articles that contain at least one keyword in their title or abstract
- Exclude articles with very narrow aspects or context (e.g. suitable only for a single case)
- Read remaining abstracts and ensure their relevance to the subject
- Further, read remaining articles in their entirety to ensure relevance of content

In addition, the following criteria were used for the content:

- The selected articles should consider value from multiple aspects (not just one element such as trust or quality) or similar aspects (if modelling does not consider value directly, the paper should still be associated with the concept of value) and this should be a significant part of the paper.
- The selected articles should consider modelling in the sense that the model is separable from a single case and can be used for decision making
- The selected articles should consider value analysis from a service perspective; they should be appropriate for the B2B context so that they are also viable for the specific focus on maintenance

We chose to omit articles examining new service development, branding, specific strategy formulation, and improving innovativeness, unless they considered especially the value modelling concept.

The different combinations of search strings produced 548 potentially relevant articles. Employing the exclusion and inclusion criteria described above, 24 papers were selected as the literature sample for more specific revision. The selection process is depicted in more detail in Figure 1 and the selected articles in Appendix 1.

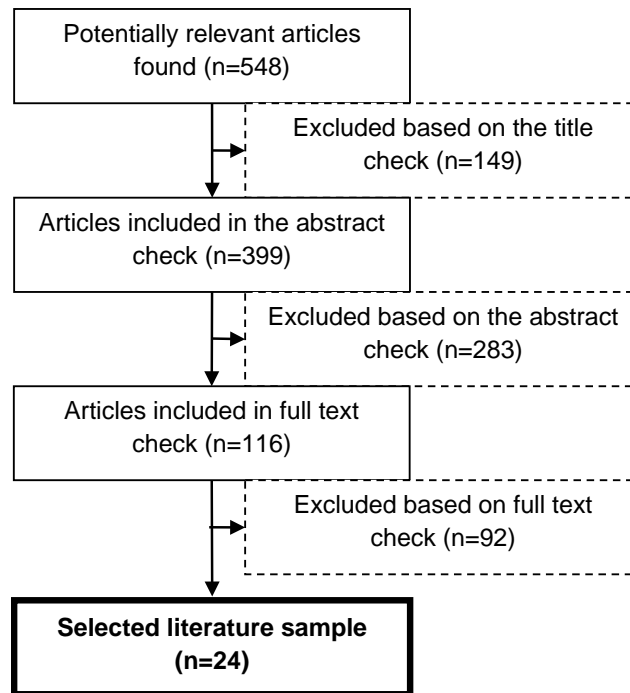


Figure 1. Literature sample selection process.

4 Results

4.1 Time distribution

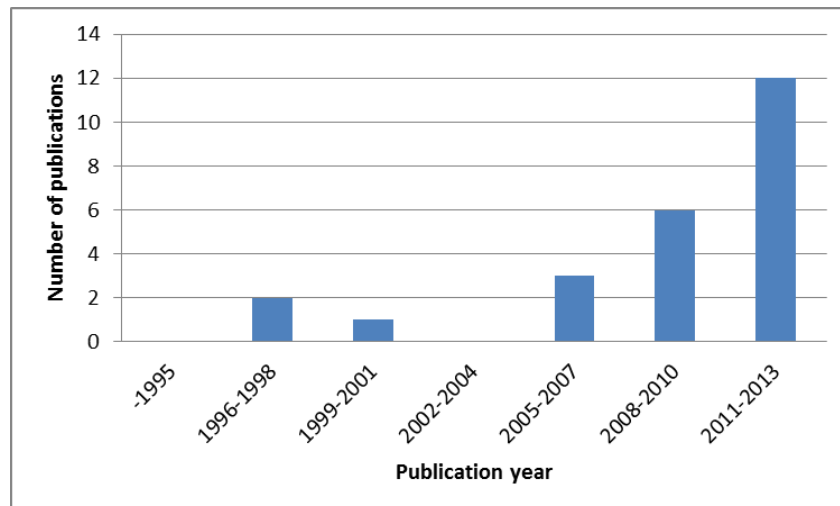


Figure 2. Time distribution of the sample.

The time distribution of articles considering value analysis models of services is shown in Figure 2. Interestingly, it is clear that the number of journal publications has increased significantly in the last nine years. Some interest in researching the area started after 1995, by Lapierre (1997, 2000) and Lynne Bennington & Cummane (1998), but after a few years there were no publications for a while, until now a rising trend towards and need for value analysis models can be seen published by several researchers.

4.2 Industry

The main industries specified in the articles are shown in Figure 3. The most researched industries were industrial services and information technology (IT) services. Especially in industrial services it has been noted that value analysis is important in order to create value and remain competitive by providing solutions for the customer. Two articles considering maintenance services were also found (Macdonald et al. 2011; Ojanen et al. 2012). Interestingly, articles considering maintenance services were found even more in the earlier stages of the process, before final exclusion (e.g. Chang & Lo, 2011; Finne & Holmström, 2013; Holmström et al., 2010; Ahonen et al., 2010; Lam, 2008). These articles were ultimately excluded from the final sample because they examined a specific problem other than value analysis (e.g. selection of the best consultant, modularization, communities).

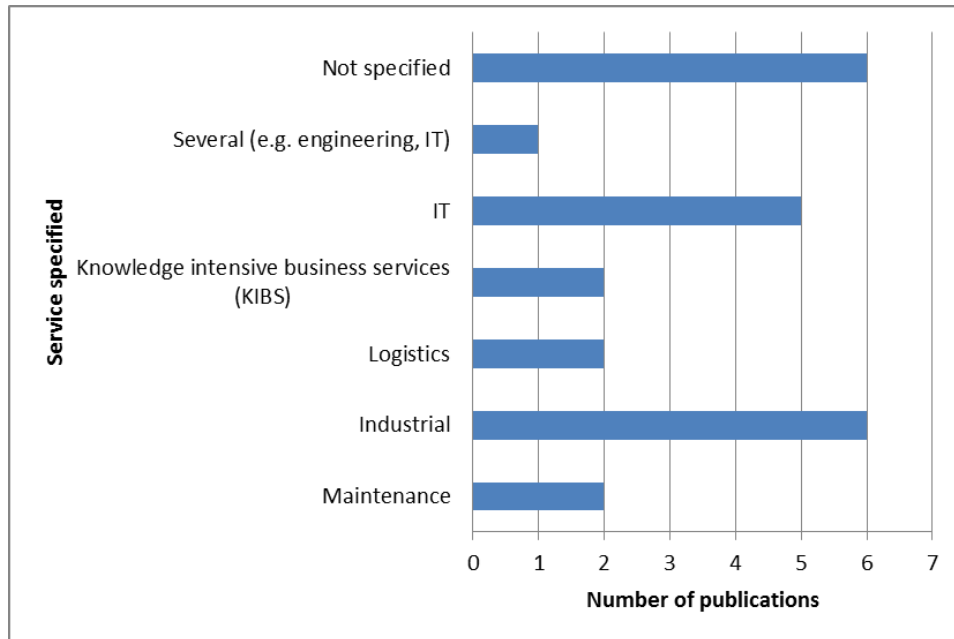


Figure 3. Distribution by industry in the reviewed articles.

4.3 Value perspective

As can be seen in Figure 4, the focus in the value analysis models is still on the customer side, as the majority considered customer value assessment or similar aspects. Supplier value in the service was considered in only two of the models.

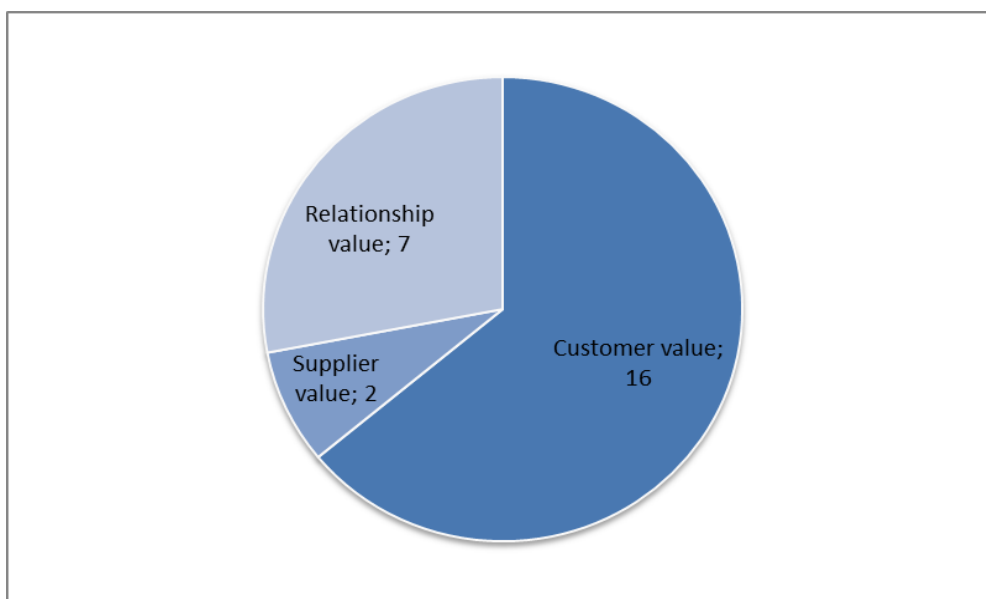


Figure 4. Value perspectives in the sample.

The relationship value perspective was identified in seven of the models. It is a positive development that at least some are focusing on mutual value creation, especially concerning B2B services where it is important to consider both parties in the value creation process. But none of the models considered more than two actors (customer and supplier).

Figure 5 depicts the value elements used in the models. The majority of the value analysis models use both tangible (e.g. profit, price, speed) and intangible (e.g. reputation, trust, commitment) value elements in assessing the value of the service (e.g. Songailiene et al., 2011; Logožar et al., 2006; Sole & Carlucci 2010; Lapierre 2000). This supports the view that value is multidimensional and comprises both monetary and non-monetary elements that need to be considered in its analysis. Five models considered primarily one dimension of value, and most of these articles recognised in their conclusions that the unevaluated elements should be taken into account in further research.

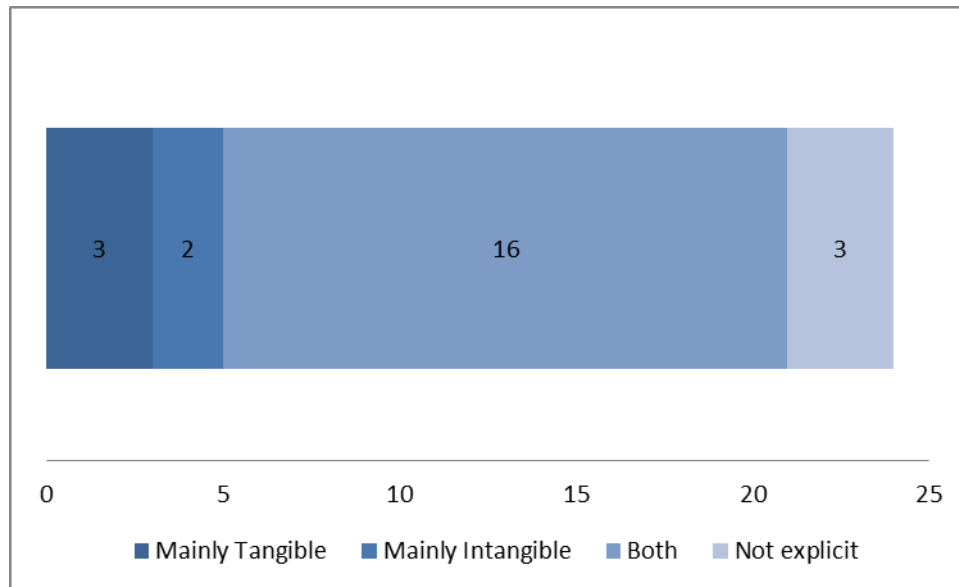


Figure 5. Measured value elements.

4.4 Managerial implications of the models

The identified models were mainly frameworks or models developed through equation modelling. As the use of equation based models is often complicated, the managerial implications of what the researches felt the model could be used for were reviewed. The majority of the managerial implications did not consider particularly versatile implications but mainly suggested that the tested model or framework should be employed for evaluation purposes in improving a party's own services or considering the value of the partner. Also other implications were suggested on a few occasions such as customer segmentation, marketing purposes, analysis in greater depth, management, prediction, comprehensive value assessment and identification purposes. As the identification of the important value elements of the service for each partner is the first step in mutual value creation, it is surprising that it was not considered in more models as a managerial implication in addition to evaluation. Even though actors are in the same relationship they might have different perceptions of the service value and therefore the differences should be identified (e.g. Corsaro & Snehota 2010; Aarikka-Stenroos & Jaakkola 2012).

The identification of value elements was mainly considered in the models for comprehensive value assessment as a first step. Only one of the models also provided value elements that could be employed to assist in value identification. Therefore, we conclude that simpler models and tools should be provided to support the first step in the value assessment process. Based on the literature review, we propose four different building blocks for inclusion in the conceptual framework: identify case specific characteristics, different dimensions of value (tangible and intangible), network partners, and creating a mutual understanding of value creating elements.

4.5 Conceptual framework

Based on the identified models and literature considering value creation in relationships, the building blocks for a conceptual framework for collaborative value analysis are now presented. Since we are focusing especially on situations where there are multiple partners (e.g. customer, supplier, service provider and equipment provider in a maintenance network) operating and actively involved in the value creation process, we can see from the literature review results that a model for the identification of service value in service networks is needed because there is a clear research gap that needs to be filled. We propose a conceptual framework and its building blocks for the identification of value elements in a collaborative service network (Figure 6).

The first part of the framework proposes identification of the case specific characteristics of the required and provided service, and which partners should be involved. Especially maintenance services are highly case specific and

therefore the characteristics need to be identified for example if a critical or non-critical item needs to be maintained (e.g. Al-Turki 2011). Often network partners have no common language and concepts are used broadly, and this emphasises the specification of a special case and its value elements.

The second part of the framework presents the different value elements of the service. It has been recognised that in maintenance services value is both tangible and intangible (e.g. Ali-Marttila et al. 2013; Ojanen et al. 2012; Toossi et al. 2013), and the literature review results support this as the majority of the service analysis models considered both. The value elements should include both tangible and intangible elements that can be chosen by the partners (Songailiene et al. 2011; Macdonald et al. 2011; La et al. 2008; Huntley 2006; Fiol et al. 2011; Ng et al. 2012; Barry & Terry 2008; Biggemann & Buttle 2012; Lynne Bennington & Cummane 1998; Logožar et al. 2006; Komulainen et al. 2007; Ojanen et al. 2012; Sole & Carlucci 2010; Aarikka-Stenroos & Jaakkola 2012; Lapierre 1997).

The third part of the framework considers the network view of industrial services. All major members of the service network identify their value elements in the service. The literature review pointed up a lack of models that considered more partners than just the customer and supplier. The framework suggests the main members of the maintenance network, as described by Marttonen et al. (2013), are the service customer, the service provider and the equipment provider. But also other partners can be added to the framework.

The fourth part of the framework proposes that once each service network member has evaluated the elements that create value, the value profiles are brought together so that the member's profiles can be identified and discussed. This is important because even though the actors are working in the same relationship they might have different perceptions of the created value (Corsaro & Snehota 2010). This leads to the fifth part of the framework, where finally the value creating elements for each party are diagnosed and discussed between practitioners to gain a mutual understanding of those elements (e.g. Aarikka-Stenroos & Jaakkola, 2012; Keränen & Jalkala, 2013; Songailiene et al., 2011). All partners should gain insights and together comment on the value process.

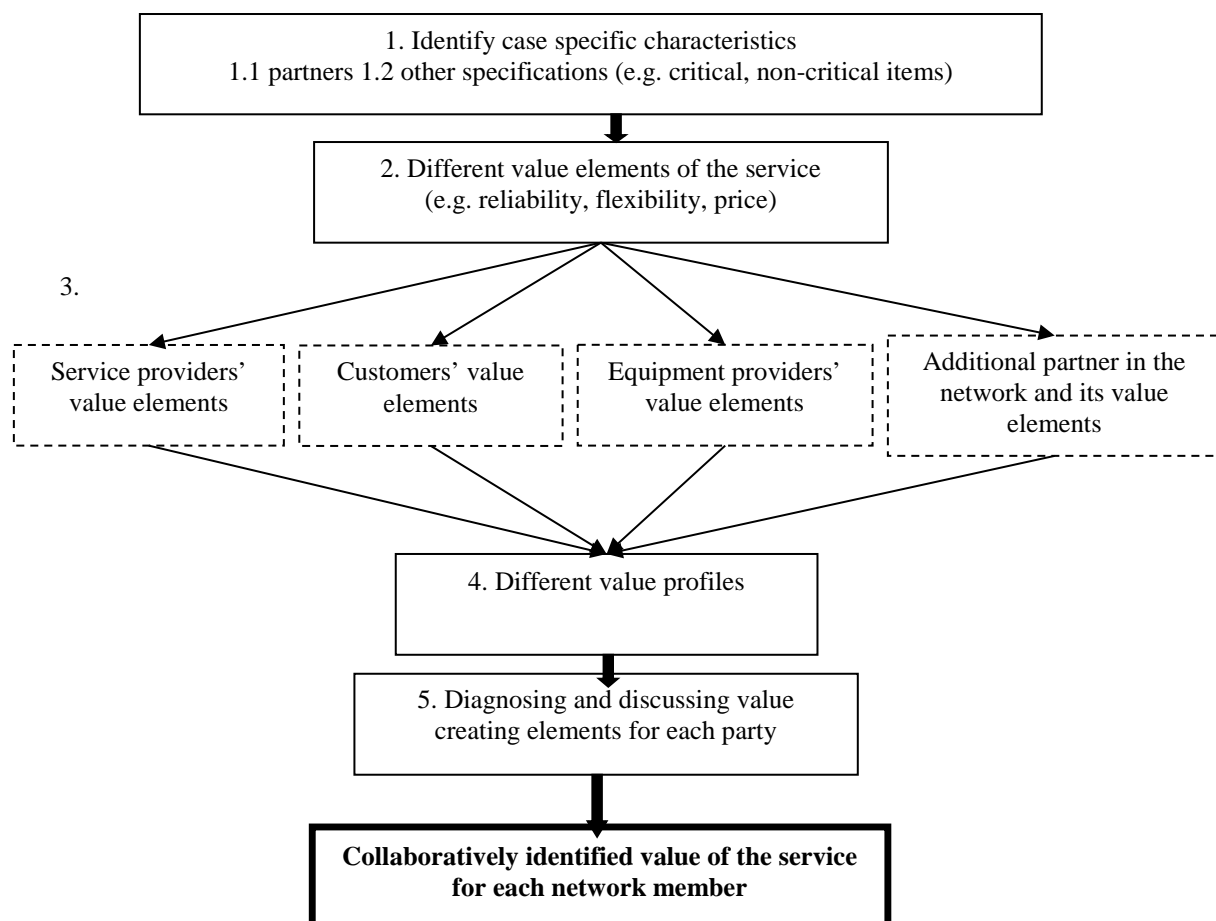


Figure 6. Conceptual framework for collaborative identification of the value elements of the industrial service.

The proposed framework can be employed as a first step in negotiations but also later for the evaluation of current and future services. The evaluation and control of the value elements is also important because the perceptions of benefits and costs may change over time (Corsaro & Snehota 2010)

5 Conclusions

The value elements of all major service network members should be identified because value is co-created. However, there is a lack of easy-to-use models that take into account the value elements of multiple network members. The growing trend for value analysis research shows that there is a need for value analysis models. But the existing models do not as yet take the collaborative context into account and therefore new models are needed to support decision making between network partners (e.g. Ahonen et al., 2010; Lapierre, 2000; MacCarthy & Jayrathe, 2012; Olsson & Espling, 2004; Panesar & Markeset, 2008; Reinartz & Ulaga, 2008).

The current value analysis models found in the systematic literature review considered mainly the customer value perspective, and suggested evaluation tools. It seems that the marketing literature is still focusing on customer value as Purchase et al. (2009) and Ramsay & Wagner (2009) earlier suggested. Supplier views are still rare and none of the identified models considered the collaborative service context where multiple partners (more than just the customer and supplier) operate; this can be considered the main research gap. Future research should also focus on easy-to-use identification models as the models uncovered did not address this. At this point, the identification process was only concluded in a few models where comprehensive value assessment was considered. Comprehensive value assessment is an important practice, but it might be too blunt a tool for some relationships. Also it was not specified how the identification process should run despite mutual discussions.

We propose a collaborative value analysis framework for industrial services which comprises five stages that conclude in a collaboratively identified value of the service. The first stage is to specify the case specific characteristics; the second provides the value elements; the third includes the different network partners; and the fourth and fifth stages present the value profiles and ensure that mutual understanding is achieved on what are the value creating elements in the service for each network partner.

We contribute to the extant value literature by presenting research gaps in the current value analysis models for B2B services. In addition, we present a conceptual framework for a collaborative value analysis model. It shows how the value for each network member can be identified.

Collaborative models and tools are needed to improve network level cooperation between members in maintenance and other B2B services, to build trust and competitive advantage. Appropriate models and their implementation strengthen the service networks and help them compete with other networks.

The systematic literature review has some limitations. Due to its focus on specific keywords, some relevant articles may have been missed. Future research should address this, and for example the reference lists and citation maps of the literature review articles could be checked to make the sample more comprehensive. Also the framework provided is only conceptual and derived from the systematic literature analysis. Empirical analysis based on the proposed concept should be conducted to complete the theoretical findings.

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Appendix

Summary report of the literature sample articles

<i>Sample article</i>	<i>Service industry</i>	<i>Value perspective</i>	<i>Tangible value elements</i>	<i>Intangible value elements</i>	<i>Managerial implication</i>
(Songailiene et al., 2011b)	Logistics	Supplier value	x	x	Segmenting Evaluation
(Grönroos & Helle, 2010)	Industrial	Customer value Supplier value (value creation)	x		Evaluation
(Pinnington & Scanlon, 2009)	-	Relationship value	(x)	x	Evaluation
(Macdonald et al., 2011)	Maintenance	Customer value (value-in-use)	x	x	Evaluation
(Töytäri et al., 2011)	Industrial	Customer value	x	(x)	Sales process
(La et al., 2008)	Several (consultants, engineers, IT)	Customer value	x	x	Segmenting Marketing
(Huntley, 2006)	Information technology	Relationship value	x	x	Sales process Marketing
(Fiol et al., 2011)	Industrial	Customer value	x	x	Evaluation Strategy
(Hansen et al., 2008)	-	Customer value		x	Customer portfolio mgmt. Tailoring the service offering
(Parry et al., 2012)	Information technology	Customer value (relationship)	x	x	Planning Prediction
(Lapierre, 2000)	Mainly Information technology	Customer value	x	x	Evaluation Improvement
(Landroguet et al., 2013)	-	Customer value	Not explicit		Analysis
(Barry & Terry, 2008)	Industrial	Relationship value (for customer)	x	x	Evaluation Prediction
(Komulainen & Tapio, 2013)	Information technology	Customer value	Not explicit		Management
(Biggemann & Buttle, 2012)	Industrial	Relationship value	x	x	Evaluation
(Lambert & Enz, 2012)	-	Relationship value (value co-creation)	Not explicit		Management Measurement
(Bennington & Cummane, 1998)	-	Customer value	x	x	Evaluation (Identification)
(Logožar et al., 2006)	Logistics	Customer value	x	x	Identification
(Komulainen et al., 2007)	Information technology	Customer value	x	x	Evaluation Segmenting
(Keränen & Jalkala, 2013b)	Industrial	Customer value (supplier perspective)	Mainly x	(x)	Comprehensive value assessment (including identification)
(Ojanen et al., 2012)	Maintenance services	Customer value	x	x	Value assessment (including identification)
(Sole & Carlucci, 2010b)	KIBS	Customer value	x	x	Evaluation
(Aarikka-Stenroos & Jaakkola, 2012b)	KIBS	Relationship value (customer value emphasised)	x	x	Analysis Joint problem solving
(Lapierre, 1997)	-	Relationship value (early stages)	X	x	Evaluation

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Customer service requirements and co-creation: Empirical study

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The aim of this study is to empirically test how customer service requirements influence the probability and extent of customer collaboration with the service provider in value creation process. Our results indicate that customer requirements affect the likelihood and intensity of customer-provider collaboration in value creation process. Our findings carry important implications for both service research and service practitioners. Understanding such relationships will enable service providers to optimize their operational strategies according to customers' diverse needs and thus enhance their profitability.

1 Introduction

The rapid development of the service sector is a result of intense global competition, which pressures companies to innovate and excel operationally, so they can address swiftly evolving customer needs and wants by all-inclusive offerings and achieve customer intimacy (Rai; Sambamurthy, 2006; Agndal et al., 2007). In fact, value creation in the service sector is explicitly customer-driven because customers' wants and needs are the actual base of designing the offerings of companies and determining factors in their competitiveness (Howden; Pressey, 2008; Vargo; Lusch, 2008). Thus, it is becoming increasingly important that service providers learn to adjust their offerings to meet divergent customers' needs successfully and interact with customers effectively. It has been suggested that value is collaboratively created with the customer and other stakeholders in a constellation of interactions that generate and form the value split among the actors in a value creating system, which, based on customers' needs, enables the choice of certain complementary elements and their bundling (Normann; Ramirez, 1993; Ramirez; Wallin, 2000; Lusch et al., 2010; Pynnönen et al., 2011).

Research on customer value (co-) creation is not new in the literature. However, there is still a need to understand the factors that affect the customers' level of engagement in value creation (e.g., Epp; Price, 2011; Lusch et al., 2010; Pynnönen et al., 2014). In this study, we focus on customer-related factors (see Kalaigianam; Varadarajan, 2006; Van Doorn; Lemon; Mittal; Nab; Pick; Pirner; Verhoef, 2010) and specifically customer service requirements. The research problem of this paper is to understand how customers' service requirements predict the likelihood of their participation in value creation processes. Specifically, we investigate how much the need for integrated services, information sharing and systemic purchasing orientation explains the probability of intensity of collaboration being high or moderate. In answering these questions, two main methods are used: cluster analysis and logistic regression analysis. In particular, empirical evidence is gathered by means of a structured questionnaire survey. Our results indicate that customers with a disposition towards integrated services are more likely to engage in intense collaboration with the service provider.

The paper is structured as follows. First, on theoretical and conceptual levels we discuss customers' participation in value co-creation. Next, we review the literature of customer service requirements focusing on systemic purchasing, integration of services and information sharing before describing the methodology and presenting the data analysis and the results. Finally, we discuss the findings and present our conclusions.

2 Theoretical background

2.1 Customers participation as co-creators

The fundamental idea in customer value creation is that the firm utilises its resource profile to optimize its product-market activities (Wernerfelt, 1984), thus creating value for its customers, which can be enhanced by identifying any links between a certain resource and a particular product in a specified market (Clulow; Barry; Gerstman, 2007). However, the customer is no longer just a target but primarily a co-producer who can be involved in the entire value creation process acting on operand resources (Vargo; Lusch, 2004). Accordingly, the customer's role in the creation of value in service offerings is central (see e.g., Normann; Ramirez, 1993; Bettencourt, Ostrom; Brown; Roundtree, 2002; Grönroos; Raval, 2011). Thus, direct interactions with the customer's value creation processes become essential. However, in industrial business-to-business context the depth and intensity of these relationships can vary from conventional transaction-based relationships to closer contractual relationship or even to advanced value partnerships and full-service contracts and solutions (see Stremersch et al., 2001). The deeper the partnership, the more important is the need for an in depth analysis and understanding of the value co-creation process.

The co-creation process can comprise the co-development (see Brax; Jonsson, 2009) and co-production of an offering (see Thomke; von Hippel, 2002). Further it has been argued that co-creation "involves the (customer) participation in the creation of the core offering itself. It can occur through shared inventiveness, co-design, or shared

production of related goods.”(Lusch; Vargo, 2006, 284). Aarikka-Stenroos and Jaakkola (2012) have identified five value co-creation activities: diagnosing needs, designing and producing the solution, organizing the process and resources, managing value conflicts, and implementing the solution; and they argue that the co-creation process can occur in parallel and in diverse order through a dialogical, hermeneutical process that includes the participation of the customer in the formulation of the value proposition.

Customer involvement discusses the opportunity for customers to fully engage themselves in the process of developing a solution which will suit their needs. The extent of customers’ participation or involvement appears to be influenced by a host of factors. According to Literature (see Kalaignanam; Varadarajan, 2006; Van Doorn; Lemon; Mittal; Nab; Pick; Pirner; Verhoef, 2010) these factors can be customer-related, product-related, firm-related and context-related. Environmental trends and developments arising from the political/legal, economic, social and technological context within which customers and providers operate seem to enable companies to engage customer in numerous processes and activities to an even greater extent (Ibid). Further, competitors and their actions also affect customer engagement (Van Doorn; Lemon; Mittal; Nab; Pick; Pirner; Verhoef, 2010). Further, product characteristics e.g. good or service, digital or non-digital etc. may influence the intensity of customer engaging in specific activities and in the whole process. Firm- related factors include issues related to the provider’s ability to increase customer participation e.g. its information resources and skills (Kalaignanam; Varadarajan, 2006).

The customer-related factors can include customer satisfaction, knowledge structure, receptivity toward the provider, and resources such as time, effort, and money (Kalaignanam; Varadarajan, 2006; Van Doorn; Lemon; Mittal; Nab; Pick; Pirner; Verhoef, 2010). Furthermore, customers’ motivation towards engaging in deep partnerships seem to be boosted when they anticipate benefits like enriched knowledge, social benefits, and economic benefits such as cost savings (Nambisan; Baron 2009; Füller, 2010). Thus, there is a need for effective platforms for information exchange and interaction as well as rewards for customers’ contributions (Baron; Warnaby 2011; Dholakia; Blazevic; Wiertz; Algesheimer, 2009; Füller 2010). In addition, customer goals as well as their needs, wants and dispositions can also affect the probability and intensity of their participation in co-creating activities (Van Doorn; Lemon; Mittal; Nab; Pick; Pirner; Verhoef, 2010). Therefore, based on the above the following hypothesis is posed:

H1. Customers’ requirements predict the likelihood of their participation in the value creation process.

2.2 Customer service requirements

2.2.1 Systemic purchasing orientation and integration

An important strategic choice of the purchasing function is associated to the distribution of the purchase entity to its supplier network. This often relates to bidding every part and service separately or buying larger entities. An advantage of the purchasing smaller entities can be recognized as market price efficiency and increased competition among suppliers. This approach is often most advantageous if organizations emphasize direct purchasing price as a measure of purchasing value. Another option is to stress the total value or cost of purchase and include the value of the whole system into consideration (Hallikas et al., 2014). This refers to the integration advantages of the system parts and services. Systemic advantages are often gained when one supplier is responsible of integrating several parts and service together. In this approach firm purchases systems rather than individual parts. This is rather similar than in the network sourcing approach (Hines, 1994) where larger entities reduces the number of direct suppliers, increases degree of supplier innovation in both new processes and processes, and involves high degree of trust, openness and profit sharing between supply network members.

Value creation is a complex phenomenon that has a strong linkage to the characteristics of the purchased service (Anderson; Narus, 1998). In the cases when the value creation is connected to the integrated and systemic features, the customers are also more willing to buy integrated systems rather than separate goods and items. An important element in the value creation is related to the phenomena of systemic value creation, which can be explained by the concepts of product bundle and integration value. The benefit of the integration can be defined as a process of bringing together potentially diverse products and services in ways that create value (Epp; Price, 2011). Systemic purchasing is also buying of material and service together. Here, buyers prefer to purchase entities as a whole package.

It has been investigated in the previous studies that systemic features may have significant role in customer purchasing orientation in the industrial service supply chains (Hallikas et al., 2013). Identified benefits of expected monetary savings, increased convenience and reduced compatibility risk are mentioned as reason to purchase bundles (Harris; Blair, 2012, Sarin et al. 2003). This implies that the customer is often likely to choose an offer which provides better systemic functionalities. Companies purchase services from different reasons, but the common denominator here is that the services procured are expected to solve some of their specific problem in somewhat collaborative way between the buyer and provider (Ulaga; Chacour, 2001; Vargo; Lusch, 2008). The customer expectation is that the provider can provide the services as a solution to the problems in hand but the relationship is bipolar i.e. the customer has also a role in the service execution (Tuli et al., 2007). The customer requirements towards the service provider can be related to customization benefits, deployment process, integration benefits and life-cycle cost advantage (Tuli et al., 2007, Worm et al., 2009).

As service providers increasingly replace single offerings with integrated solutions, their connections with their customers become stronger (Hax; Wilde, 1999; Gudergan, 2010). This is because of the greater depth of the customer-provider relationship in integrated service provision (Davies; Brady; Hobday, 2007). Specifically, these stronger bonds are enhanced by close proximity to the customer, which makes it possible for providers to foresee their needs and successfully collaborate to develop and configure new technology, products and services that fulfil these needs (Davies, 2004). In fact, it has been widely argued that companies should be able to understand the customer's perspective on value creation in order to provide solutions that link optimally to the customer's priorities (Wise; Baumgartner, 1999; Galbraith, 2002; Davies, 2004). Previous studies (e.g. Oliva; Kallenberg, 2003; Matthyssens; Vandenbempt; Weyns, 2009) have recognized that customer involvement and close collaboration with a leading customer is followed by successful industrial service development. However, further investigation is needed regarding the need for the close collaboration and participation of customers (Windahl; Lakemond, 2006). Since different customer goals and integration requirements demand diverse collaborative strategies.

2.2.2 Information sharing

Information sharing has been regarded as an essential element in an effective supply chain relationship between buyer and supplier. For example the study of Lee et al. (2000) illustrates that the value of demand information sharing can be quite high in the case of buyers and their upstream suppliers. Other reported information sharing benefits derived from the research include that supply chain members can gain benefits in terms of reductions in inventory levels and cost savings from forming partnerships with one another (Yu et al. 2001). Additionally, information sharing allows companies to make reliable delivery and introduce products to the market fast (Li; Lin, 2006) which leads to high levels of integration among partners in the supply chain (Jarrell, 1998).

However, making the information accessible is not enough as the significance of its impact on customer-provider relationships highly depends on what information is shared, when and how it is shared. The quality of information shared (e.g. the accuracy, timeliness, adequacy, and credibility) has a positive effect on customer satisfaction and partnership quality (Monczka; Petersen; Handfield; Ragatz, 1998; Spekman; Kamauff; Myhr, 1998. Lee; Kim, 1999). According to Van Doorn et al. (2010) when customer has all the necessary information about the provider is more likely to participate in value creating activities and processes. It follows that information sharing has value creation potential in terms of collaboration with customer (Hallikas et al., 2014), meaning that the provision of real-time, customer-level information and interaction enable the creation of long-term profitable customer relationships (Massey; Montoya-Weiss; Holcom, 2001).

3. Methodology

3.1. Sample and data collection

The method of data collection includes a structured questionnaire survey. As our target group we selected customers of the B-to-B infrastructure service provider whose purchases related mainly to the IT network and the energy infrastructure. Data were collected through a web survey and the link was sent to the customers via the CRM system of the infrastructure service provider. Two weeks after the original posting we sent a reminder to the same respondent list. The general survey instrument included measures covering background information, systemic purchasing orientation, collaboration between the focal firm and its customers, as well reflections on the importance of integrating separate services. We classified the respondents as knowledge workers, managers or specialists. The respondent ratio was 17 per cent that is; there were 149 responses to the 864 emails sent. A T-test was conducted to assess the existence of a non-response bias on all variables. Based on Armstrong and Overton (1977) we compared the early respondent groups to those that responded after a reminder. Since no statistically significant differences were revealed, we concluded that non-response bias did not affect the results of the study.

3.2. Measures and descriptive statistics

The measurement included multi-item scales that were mainly gathered from the previous literature and modified to fit the scope of this study. All items were statements measured with a seven-point Likert-scale ranging from 1 = not very important to 7 = very important or from 1 = strongly disagree to 7 = strongly agree.

First, we mapped the provider's service offering in workshops with a group of experts and specialists from the provider. They described the service attributes and evaluated the service offering. Table 1 lists the service functions. To measure the customer's need for integrated services, we then asked them to evaluate the importance of the integration of a service in a total service package. Intensity of collaboration comprises measures related to the intensity of co-development (Brax; Jonsson, 2009) and co-production of the service offering (Thomke; von Hippel, 2002).

Table 1. Services.

Service	Description
Helping in network development	Network-present-state studies, planning and developing networks
Network design	Implementation plan for network-development strategies
Field planning	Planning network routing and resolving land-usage issues
Work planning	Planning the network structures and the execution of the construction
Excavation work	Digging trenches and burying cables, Installing fibers, wires and pipelines
Connecting networks	Scheduling start-up with the network operator and other customers, connecting cables
Quality inspection	Inspecting the operability of the network and removing possible problems/faults
Preventive maintenance	Monitoring the network condition and introducing measures to ensure its functioning
Spare-part management	Ensuring the supply of spare parts for standby situations
Fault-situation management	Receiving alerts, Locating the site, Forming repair plans, Arranging fault separation
Fault separation	Arranging back-up connections and on-line reserve power
Fault locating (on-site)	Locating faults on site by visual means or with special equipment
Fault repairing	Bringing out damaged network parts, repairing indicated faults at the site
Automation	Creating interfaces between customer databases and the service provider's systems
Logistics	Managing stock and ordering supplies as a complete service
Aligning processes with the customer	Defining interactions between customer and service provider
Reporting	Services for sharing documents and reports between customer and service provider

Furthermore, systemic purchasing orientation reflects buying behavior that is service dominant when the purchased system consists of both goods and services. Generally, integration is defined as the process of gathering together potentially diverse products and services in order to create value (Epp; Price, 2011). When the definition is applied to purchasing and supply management, services and products can be purchased from one supplier and system suppliers are preferred (Davies et al., 2007). Provider information sharing on network level is considered an important aspect of customer-provider relationships (Lancastre; Lages, 2006). Communication can be defined as the formal or informal sharing of meaningful and timely information between firms (Anderson; Narus, 1990). One essential feature is availability and consistency of the shared information in the interests of speed and convenience at the general-solution level (Mikkonen, 2011). Table 2 reports the descriptive statistics and Alpha scores.

Table 2. Descriptive statistics.



Measures	N	Mean	St. Dev	Alpha
Intensity of collaboration	139	5,95	0,83	0,912
The service offering is continuously developed in collaboration with our personnel.				
We co-operate extensively with service provider with respect to service design.				
We co-operate extensively with service provider with respect to service process design.				
We co-operate extensively with service provider with respect to forecasting and production planning.				
We co-operate extensively with service provider with respect to quality practices.				
Intention to systemic purchasing	139	4,60	1,22	0,733

<i>Measures</i>	<i>N</i>	<i>Mean</i>	<i>St. Dev</i>	<i>Alpha</i>
We appreciate that whole service package can be purchased from one supplier. Our aim is at purchasing whole service systems rather than separate service elements. We pay much attention to that purchased services are integrated in a way that they work smoothly together.				
Information sharing	141	5,42	0,84	0,781
Information is tailored for my task Information matches with the information from other sources Information is online Provider offers information about ongoing performance				
Need for integration	135	5,18	1,03	0,907
See Table 1				

3.3 Data analysis and findings

Two research methods were utilized. First, cluster analysis was used to classify the respondents based on the extent of their collaboration with the service provider in the value creation process. The results of the cluster analysis were used to transform our dependent variable (intensity of collaboration) into binary for the needs of logistic regression analysis (LR). The binary variable was made using mean as the cut point. Thus, in the new variable, 0 represents moderate collaboration and 1 high collaboration (see table 3). The independent variables of the analysis are the need for integrated services, information sharing and systemic purchasing orientation. Analysis for both cluster analysis and logistic regression was performed using IBM SPSS Package.

Table 3. Clusters.

Cluster	1	2
Description	Moderate collaboration	High collaboration
Size	 51,8% (72)	 48,2% (67)
Mean	3,71	5,56

Logistic regression analysis was used because it can assist in profiling the intergroup characteristics of the subjects and in allocating them to their appropriate groups. Specifically, LR enables the understanding and explanation of research problems that involve a single categorical dependent variable and numerous metric independent variables. The outcomes of logistic regression can assist in profiling the intergroup characteristics of the subjects and in allocating them to their appropriate groups (Hair; Black; Babin; Anderson, 1998). Unlike in the linear regression, a logistic regression model is based on predicting probabilities between two cases. Further, compared to other research methods, logistic regression is more flexible since it does not make any assumptions about the distributions of the variables (Landau; Everitt, 2004; Tabachnick; Fidell, 2013).

A test of the full model against a constant only model was statistically significant (Table 4), indicating that the predictors as a set reliably distinguished between those engaging in moderate co-creation and those of in high co-creation (chi square = 14,664, $p < .05$ with $df = 3$). Nagelkerke's R Square (Table 5) of 0,150 indicated a moderate relationship between prediction and grouping. The classification results (see table 7) shows that inclusion of the need for integrated services, information sharing and systemic purchasing orientation factors increase the percentage of correct classification by 0,7 to 73,1%-compared to the 72,4% for the step 0 when only the intercept was included into the model-. According to the Hosmer and Lemeshow (H&L) value (see Table 6), which measures the correspondence of the actual and predicted values of the dependent variable (Hair; Black; Babin; Anderson, 1998), we have a non-significant chi-square value ($p > 0,05$) indicating a smaller difference in the observed and predicted classification, meaning that our model is good.

Table 4. Omnibus Tests of Model Coefficients.

		Chi-square	df	Sig.
Step 1	Step	14,664	3	0,002
	Block	14,664	3	0,002
	Model	14,664	3	0,002

Table 5. Model Summary.

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	143,256	0,104	0,150

^a. Estimation terminated at iteration number 4 because parameter estimates changed by less than ,001.

Table 6. Hosmer and Lemeshow Test.

Step	Chi-square	df	Sig.
1	3,918	8	0,864

Table 7. Classification Table.

Observed		Predicted		
		Collaboration		Percentage Correct
		Moderate	High	
Collaboration	Moderate	7	30	18,9
	High	6	91	93,8
Overall Percentage				73,1

The Wald criterion demonstrated (see table 8) that the only factor having a statistically significant ($p=0,004$) effect on the dependent variable, intensity of collaboration, is the factor of need for integration. When analyzing the Exp(B) column, it indicates that the customers with a disposition towards integrated services are 1,917 times more likely to engage in intense collaboration with the service provider. The p-values for the other factors are quite high (SPO: $p=0,134$, IS: $p=0,494$), indicating that they are not significantly predictable for co-creation.

Table 8. Results of the binary logistic regression analysis.

	B	S.Error	Wald Chi-square	Df	Sig.	Exp (B)
Systemic purchasing orientation	0,381	0,254	2,245	1	0,134	1,464
Information sharing	-0,184	0,269	0,467	1	0,494	0,832
Need for integration	0,651	0,224	8,472	1	0,004	1,917
Constant	-3,586	1,775	4,081	1	0,043	0,028

Finally, we calculated the values for standardized residuals and Cook's distance, and save them to the data set. To eliminate the outliers and influential cases, we request the cases that are not outliers or influential cases. Namely, we utilized a formula that specifies that we should include cases if the absolute value of standardized residuals is less than 3 and the Cook's distance value is less than 1.0. Our results showed that there is no outlier effect and no case need to be removed; therefore we do not remove any of the observations.

4 Discussion and conclusions

The aim of this study was to empirically test how customer service requirements (i.e. the need for integrated services, information sharing and systemic purchasing orientation) influence the probability and extent of customer collaboration with the service provider in value creation processes. Our results indicate that customer requirements affect the likelihood and intensity of customer participation as co-producers, so our hypothesis is accepted. This result contributes to literature regarding customer participation (e.g. Kalaignanam; Varadarajan, 2006); customer engagement behavior

(e.g. Van Doorn; Lemon; Mittal; Nab; Pick; Pirner; Verhoef, 2010) and the generic service-dominant logic (see Vargo & Lusch, 2004; Vargo & Lusch, 2008; Hallikas et al., 2014). These streams of research have highlighted the importance of customer's role in value creation and have provided frameworks that help in understanding the different aspects of customer participation in this process. However, there is still need to go deeper in these aspects and empirically test their relationships and our study contributes in that part.

Previous studies (e.g., Windahl & Lakemond, 2006; Vargo & Lusch, 2008; Hallikas et al., 2014) argued that the customer is always involved as a co-creator of value and the intense collaboration and key development responsibilities of the provider are fundamental elements of integrated purchasing. Additionally, the previous literature (e.g., Morgan & Hunt, 1994; Davies et al., 2007; Caldwell et al., 2009) found that the customer-provider relationship in integrated service provision does not end with the purchase and is in effect a partnership, implying that customers in need for integrated services are inclined to participate more intensively as co-producers. Our results largely support these arguments; as it seems that customers in need of integration are more likely to engage in strong collaboration. Interestingly, our findings indicate that information sharing and systemic purchasing orientation do not significantly predict the extent of collaboration. Firstly, the result for information sharing could be explained by the fact that today reliable information are openly available and from various sources, hence access to information does not necessarily need intense participatory behavior. Secondly, the result concerning systemic purchasing orientation could be explained by the fact that customers that prefer purchasing seamless-functioning whole service packages from one service provider expect that their participation in the development of the offerings is the least possible.

The results of this study also have interesting implications for service providers. First, our results clearly indicate a growing need for service providers to be able to adjust their cooperative resources, capabilities, and processes according to the diverse requirements of their customers' needs. Specifically, providers of integrated service offerings should be capable of intense collaboration and interaction with the customer. Further, it is no more enough for service providers to segment their customers based on their perceptions of the brand or other demographic criteria. Other factors such as customers' propensity to participate in value creation activities should be considered as they can help to form more thorough segmentation strategies and boost the efficiency of their operations with the ultimate goal to maximize profitability.

4.1 Limitations and further research

The following limitations of our study will serve as the basis for further research. First, the degree of Nagelkerke's R (0,150) in our model seems moderate to low. This result indicates that other factors could better predict the likelihood of intense collaboration. Further research could strive to identify such factors in order to create a more comprehensive view of the influences on the probability and extent of customers' engagement in value creation activities. For example, customer satisfaction, perceived costs and benefits etc. (see Van Doorn; Lemon; Mittal; Nab; Pick; Pirner; Verhoef, 2010) are potential customer related factors. However, apart from customer related factors, literature (Kalaigianam; Varadarajan, 2006; Van Doorn; Lemon; Mittal; Nab; Pick; Pirner; Verhoef, 2010) has identified factors related to the firm, environment and product. Hence, an interesting future study could search for how much such factors (e.g. firm reputation, provider's informational skills, digital vs. non-digital products etc.) predict the intensity of customer participation. Such findings would further contribute to the research on customer engagement, customer participation and value co-creation. In addition, future research could also investigate how different factors interact with each other to influence the customers' participatory behavior.

The measures were explored within the customer base of one service firm, which limited the generalizability of the results. Further studies could focus on a larger number of firms, including those in other industries, thereby increasing the generalizability of the results. Additionally, even though the analysis showed that a non-response bias did not influence the results, a larger sample would have strengthened our findings. Finally, further in-depth qualitative and quantitative studies are needed to investigate these phenomena and determine why and how they occur.

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Service Productivity: Evaluation of Concepts from Literature

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Abstract

Reviewing the literature you will find high level concepts to measure service productivity. The purpose of this paper is to point out that there is a need of a practical approach to measure service productivity. Common service productivity concepts from literature are introduced and evaluated with the aid of a structured criteria model. The criteria model will especially evaluate the practical application of the concepts in service companies with high interactions between customers and suppliers. A lot of concepts point out that there is a correlation between service quality and service productivity. But these concepts do not consider how to measure this correlation between service quality and service productivity. Service productivity concepts from the literature consider either the “what” but not the “how”.

1 Introduction

The measurement and evaluation of service productivity is quite different than for industrial processes. Especially services with high interaction between customer and supplier are characterized by process performance and product output performance. Customers not only evaluate service product but also service process. Therefore measurement and evaluation concepts have to consider not only process output figures but also process performance figures. Process performance figures are characterized by three dimensions: quality, time and cost (Magnusson et al., 2001). All these three dimensions need to be taken into consideration for the measurement and evaluation of service productivity. These figures interrelates which each other. Service productivity concepts have to show the relationship between the figures.

Reviewing the literature you will find high level service productivity concepts, which are neither practically applicable nor show the interrelationship between service process and service product. This paper will introduce widely known service productivity concepts from literature. Afterwards these concepts will be evaluated with the aid of a criteria catalogue to point out the need of a practical approach to measure and evaluate service productivity.

2 Approach

A lot of concepts of productivity measurement in manufacturing were introduced years ago and are based on the relationship between outputs and inputs. Concepts of service productivity measurement are quite rare and at the moment a very important research field (Johnston/Jones, 2003; Biege et al., 2013). The biggest challenge is that you especially have to consider the interaction of the customer during the service production process if you want to measure service productivity. Therefore it is impossible to simply transform traditional manufacturing productivity measurement approaches to services (Biege et al., 2013). Furthermore you have to deal with quality issues during service productivity measurement. The customer not only evaluates service product but also service process performance. It is a dynamic evaluation of the customer, which has to be taken into consideration during the service productivity measurement. In the following sections of this paper widely known service productivity concepts from literature will be introduced. Next step will be the evaluation of the concepts concerning their practical application.

2.1 Service productivity concept of Parasuraman

The concept of Parasuraman describes service productivity from the viewpoint of the customer and the service supplier. Service quality is one major fact in this concept, as it is the connection point between customer and service supplier (Parasuraman, 2010; Parasuraman, 2002).

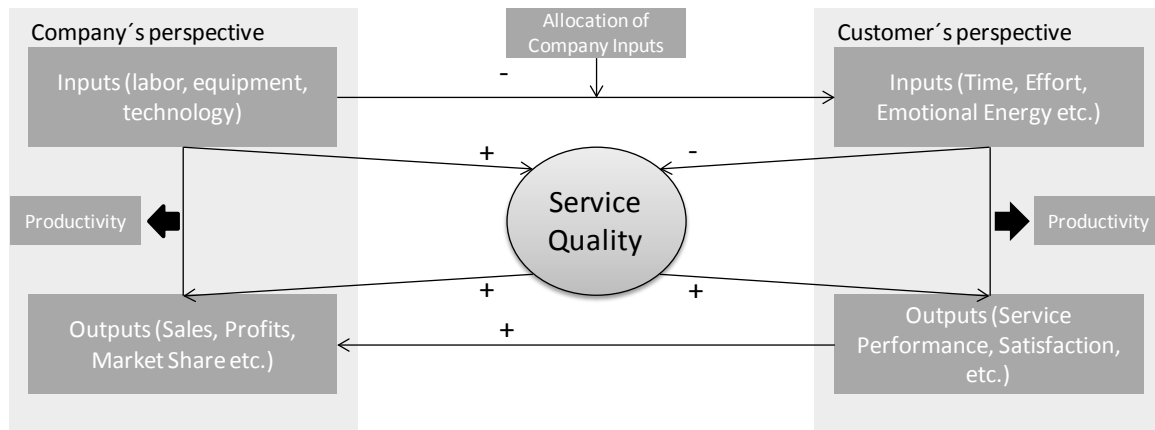


Figure 1. Service Productivity Concept of Parasuraman (Parasuraman, 2002).

The productivities stand in relation with each other. On the one hand the inputs from customers and suppliers are substitutable. There is a need of an effective allocation of resource on the input side. On the other hand outputs also stand in relationship. Customer's output (e.g. customer satisfaction) has a positive effect of suppliers output. The concept of Parasuraman takes the service quality into account. Service quality is here neither an input nor an output of service productivity. It is rather a separate variable, which is influenced by input factors from customer and supplier and which influence their output factors (Parasuraman, 2010; Parasuraman, 2002).

2.2 Service Productivity Concept of Grönroos and Ojasalo

In the concept of Grönroos and Ojasalo the integration of customers in the service process is a significant factor. Grönroos and Ojasalo make a distinction between three different service processes (Grönroos/Ojasalo, 2004; Grönroos, 2007):

- Service process which is solely created by the service provider
- Service process which is created from customer and service provider
- Service process which is solely created by the customer

The following figure shows the concept of Grönroos and Ojasalo.

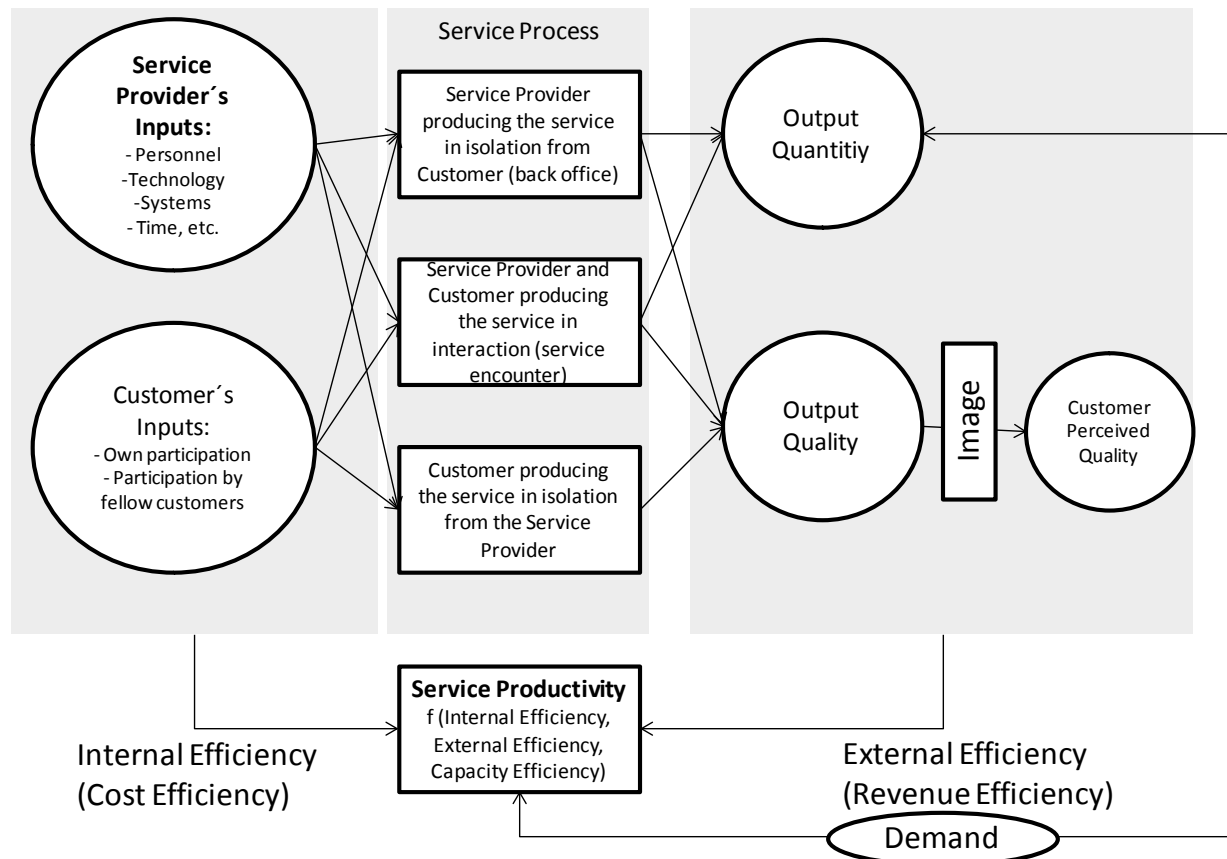


Figure 2. Service Productivity Concept of Grönroos and Ojasalo (Grönroos/Ojasalo, 2004).

Like other concepts Grönroos and Ojasalo differ between objective and subjective outputs. They point out the importance of quality aspects in service processes, either as output parameter or during the service process. Further the concept of Grönroos and Ojasalo makes a difference between several types of efficiency (Grönroos, 2007):

- Internal efficiency
- External efficiency
- Capacity efficiency

Internal efficiency describes the relationship between produced output and used resources. External efficiency is the ability to achieve a certain degree of quality in the context of service offering. Capacity efficiency reflects the degree of capacity utilization. Grönroos and Ojasalo point out that there could be a negative relationship between quality and capacity utilization. A high degree of capacity utilization can result in a degradation of quality perception (e.g. a company reduces its staff capacity to optimize the utilization ratio. Result is a higher waiting time for customers and a reduction of perceived quality (Grönroos, 2007).

2.3 Service Productivity Concept of Johnston et al.

The concept from Johnston et al. makes a difference between operational productivity and customer productivity, which overlap to some extent (Johnston/Jones, 2003; Johnston/Clark, 2001).

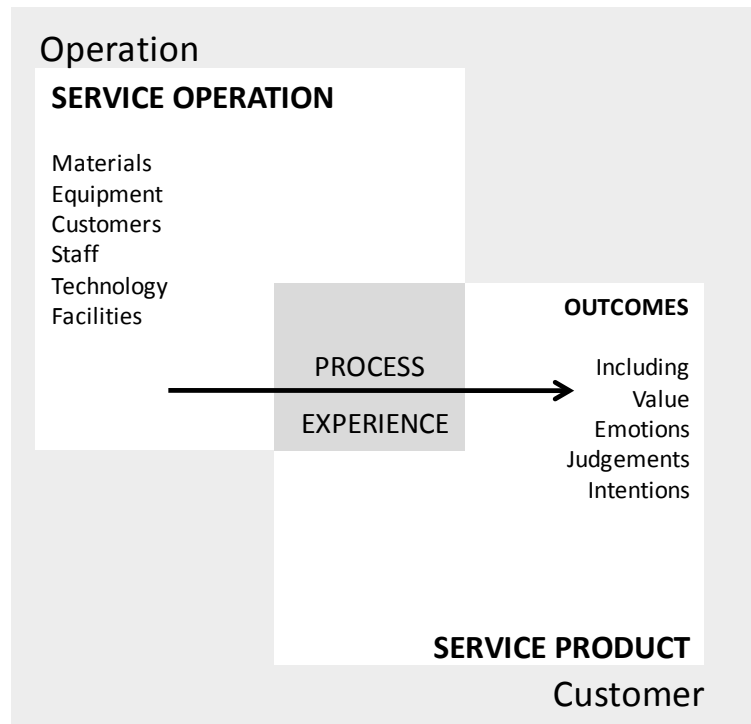


Figure 3. Service Productivity Concept of Johnston et al. (Johnston/Clark, 2001).

Operational productivity is the quotation of operational outputs to inputs over a certain time period. In this context inputs are materials, customers, employees and costs. Outputs are customers, used resources, revenues. Customer productivity is the quotation of customer inputs (e.g. time, cost, efforts) and outputs (like experiences und benefits). Service quality is not a separate figure in the concept of Johnston and Jones but one output between lots of output parameters. For Johnston and Jones the biggest challenge is the definition of the relationship between operational productivity and customer productivity (Johnston/Jones, 2003).

2.4 Service Productivity Concept of Corsten

The concept of Corsten distinguishes two service productivities (Corsten, 1994; Corsten, 2007):

Internal developed willingness to produce (potential phase)

Productivity of end combination (production phase)

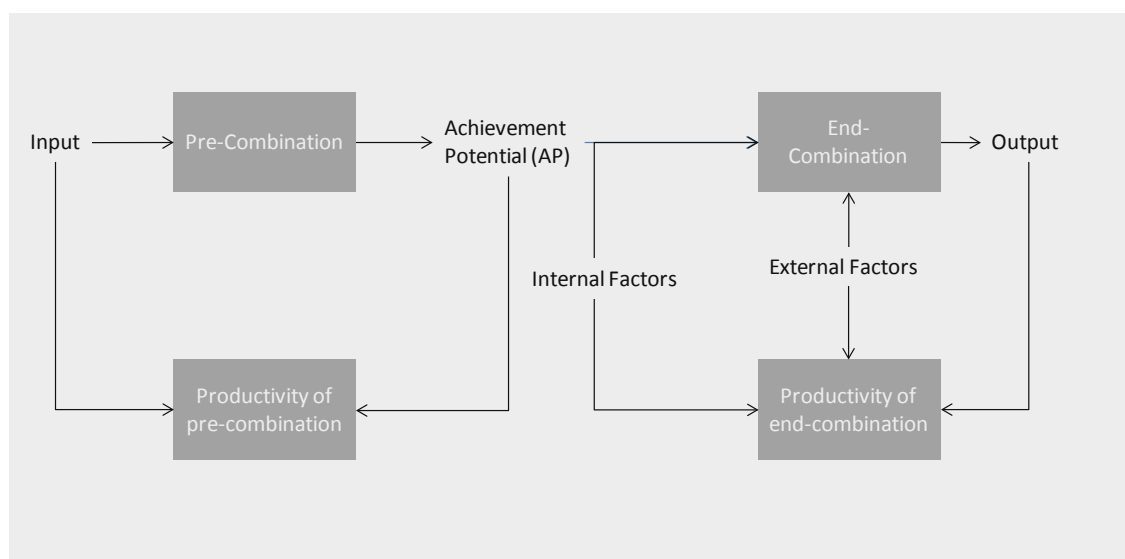


Figure 4. Service Productivity Concept of Corsten (Corsten, 2007).

The potential phase is that part of service production process, which is independent from customer. In the potential phase the service provider reveals the potential of his service offerings. For example a hairdresser makes his premises and work utilities available to state his potential to implement the service. In the second phase, the productivity of end

combination, the potential of service is used to generate the service output. In the hair dresser example this would be the process of hair cutting. Due to the differentiation between potential phase and production phase there is separation of productivity measurement. The measurement of productivity in the potential phase is equivalent to the traditional industrial productivity concept. The productivity of the potential phase is an input of the productivity of the production phase. During the production phase there is an interaction between customer and service provider. Therefore there are three different factors, which influence the productivity of the production phase (Corsten, 1994):

- the productivity of the potential phase
- the interaction between customer and service provider
- the performance of the service provider during the production phase

2.5 Service Productivity Concept of Kleinaltenkamp et al.

The concept of Kleinaltenkamp et al. differs between two productivities (Kleinaltenkamp et al., 2008). In the first phase, the potential phase, the non-current and current assets are the basis for the service production process. The combination of assets and the capabilities and resources of service provider constitute the internal factor and define the service potential. In the second phase the internal factors and the external factors, e.g. the consumer, are combined with each other to produce the service. The integration of external factor is the main difference between the first and the second phase. In this context Kleinaltenkamp et al. point out, that the integration of external factors during the service production process can optimize but also reduce the efficiency of the service provider. That depends on the capability of the customer (Kleinaltenkamp et al. 2008).

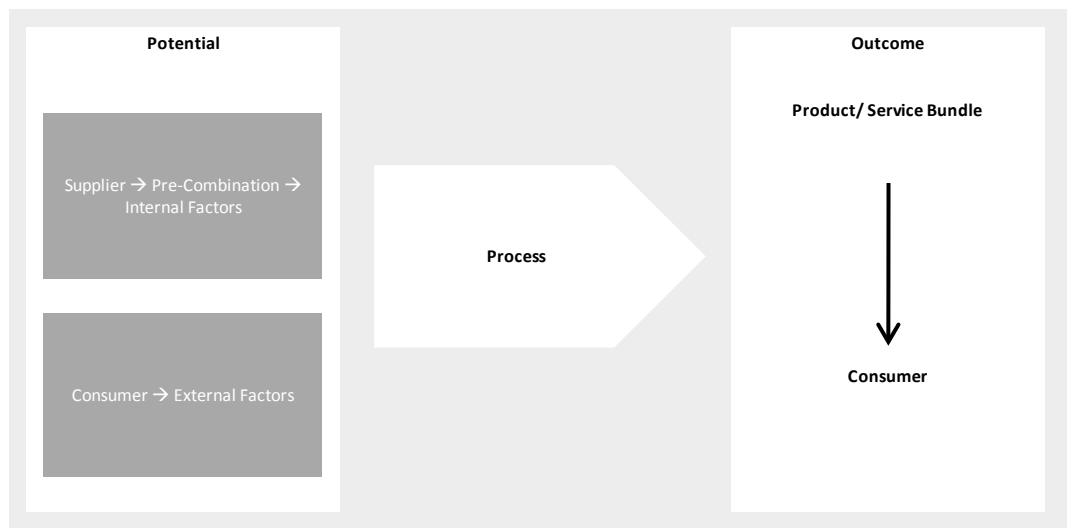


Figure 5. Service Productivity Concept of Kleinaltenkamp et al. (Kleinaltenkamp et al., 2004).

2.6 Service Productivity Concept of McLaughlin and Coffey

McLaughlin and Coffey define a classification scheme with the following dimensions (McLaughlin/Coffey, 1990):

- complexity of inputs and outputs
- degree of aggregation
- customization

Complexity of inputs and outputs means first of all how many inputs and outputs characterize the service process. McLaughlin and Coffey point out, that the complexity depends on the service mix (number and type of service offered).

Degree of aggregation differs between the measurement of outputs and inputs on an aggregate (e.g. firm level) or disaggregate (e.g. process level) basis (McLaughlin and Coffey, 1990).

Customization refers to the degree of variability in the output of the process. This variability depends on the degree of consumer involvement during the service production process.

McLaughlin and Coffey use this classification scheme to position common methods of productivity measurement, like output/input ratios, Data Enveloped Analysis or Quality plus techniques (Quality plus techniques describes the recognition of quality during the service productivity measurement). They integrated this classification scheme into their procedure for Service productivity analysis, which is illustrated in the following figure.

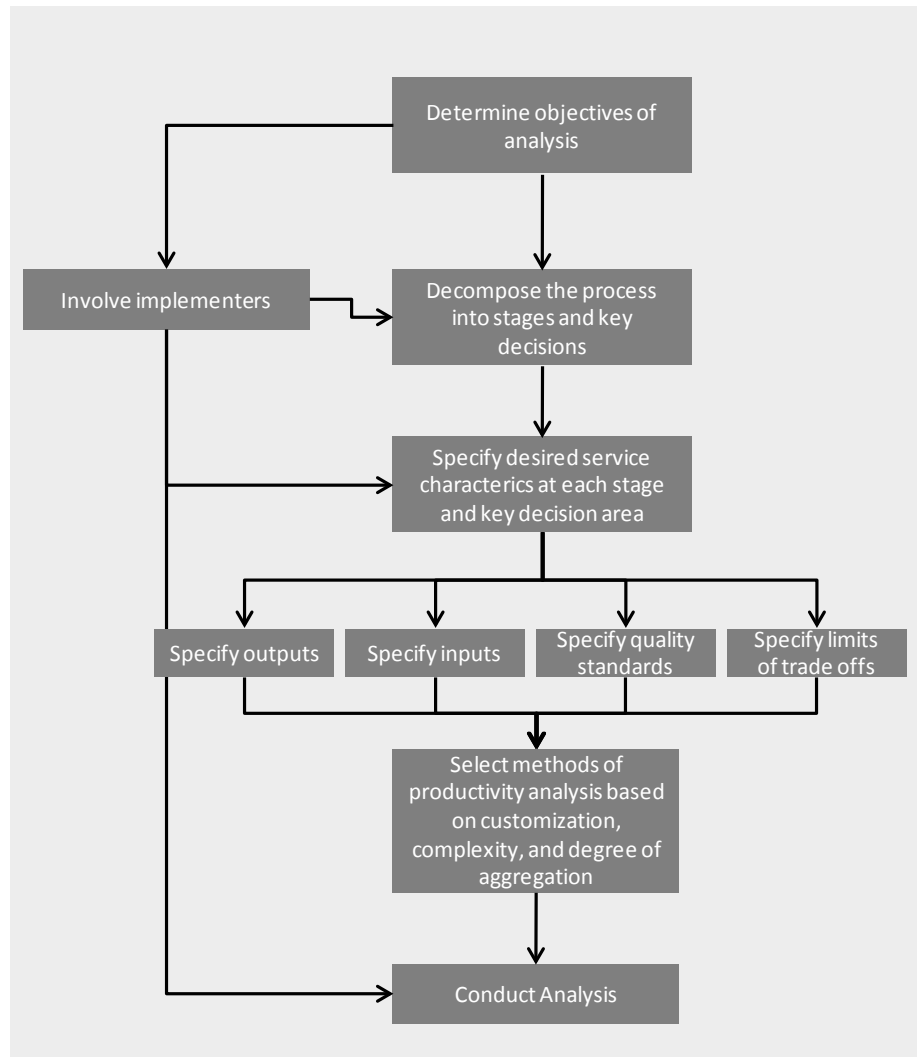


Figure 6. Service Productivity Concept of McLaughlin and Coffey (McLaughlin/Coffey, 1990).

2.7 Evaluation of the concepts

In the following the service productivity concepts will be evaluated especially concerning their practical application. Therefore there is a need to define the criteria which are characteristic for the practical application. The main requirement for the criteria is that they describe the “how” and not only the “what” of the measurement of service productivity.

The main question in this context is: How can we measure and evaluate service productivity and what do we need therefore? The authors define main criteria to evaluate service productivity concepts concerning their practical application:

- Service productivity measurement needs key performance indicators on input and output side. So there is a need of a methodology to generate key performance indicators.
- The performance measurements indicators should also cover the whole process performance. That means that they have to be derived from the dimensions quality, time and cost.
- Key performance indicators have to be in relationship with each other on the input and output side. The service productivity concept has to consider the relationship between the key performance indicators.
- Service productivity concepts should have a method to aggregate service productivities to an overall productivity.
- There is a need of the definition of concrete measurement points in the service process to measure service productivity.
- Service productivity has to recognize service quality during the service production process and as output parameter. The customer not only evaluates the output of a service but also the service production process.
- Service productivity concepts has to take into account that the overall service productivity consists of customer part of productivity and operational productivity

- There has to be a systematic to define the concrete relationship between customer part of productivity and operational productivity.

The following figure shows the result of the evaluation of the introduced service productivity measurement concepts.

Criterion	Concept of Parasuraman	Concept of Grönroos and Ojasalo	Concept of Johnston and Jones	Concept of Corsten	Concept of Kleinaltenkamp	Concept of McLaughlin and Coffey
Recognition of key performance indicators (kpi)						
Coverage of the whole process performance						
Definition of the relationship between the kpi's						
Consideration of an aggregation method						
Definition of concrete measurement points						
Recognition of Service Quality						
Recognition of customer part of productivity and operational productivity						
Definition of the relationship between customer productivity and operational productivity						

Fully fullfilled
 Largely fullfilled

half fullfilled
 less fullfilled

Not considered

Figure 7. Evaluation overview of introduced service productivity concepts.

Figure 7 illustrates that none of the service productivity concepts are fully suitable for practical application. The main deficits are the recognition of performance indicators, the coverage of whole process performance, the definition of the relationship of key performance indicators and the definition of an aggregation approach for an overall productivity. The concepts mainly make clear what we have to do to measure service productivity but they have deficits in the definition of the how.

3 Summary and Outlook

Service productivity measurement is quite different than industrial productivity measurement. There is a need of the consideration of customer's influences during service processes and that customers not only evaluate the service product but also the service process. Therefore it is impossible to adapt industrial productivity measurement concepts for services.

It has been shown, that the illustrated service productivity concepts are not fully suitable for practical application. The main focus of the presented service productivity concepts is to illustrate service productivity measurement from a high-level view but not from operational view. There is a need of a generic approach to concretely measure service productivity. In this concept you especially have to deal with key performance indicators and their concrete relationship, with aggregation approaches to define overall productivity. You also have to consider the whole process performance and therefore the dimensions quality, time and cost with the definition of their relationship. The introduced service productivity concepts provide a solid framework for further research and development of practically applicable approaches.

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Eco-innovative construction business models for social development

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Abstract

ecobim project has already identified a number of business opportunities for eco-innovation within the construction sector. Opportunities related to BIM, PLM, LCA and Monitoring are being developed through real case studies in Finland, France and Germany. Other opportunities not related to BIMs and ICTs are explored through co-creation workshops with different stakeholder groups supported by ecobim networking platform.

This paper focuses on the findings of the methodology followed in the workshops to develop eco-innovative services for social development and their corresponding business models, seen from the perspective of service research theory and in terms of service development.

1 Introduction: ecobim context

The main expected outcome of ecobim, Value Driven Life Cycle Based Sustainable Business Models (Eco-Innova 1st Call) is the development of a set of guidelines based on indicators for sustainable eco-innovative construction business models. As a result, this process will also provide a roadmap for enterprises, particularly SMEs, at a European level, and easy-to-understand recommendations for policy makers. It has also established an online networking platform with SMEs to discover new innovation fields within the construction sector and develop the required methodologies and tools to serve the whole value network.

ecobim project has already identified a number of opportunities for eco-innovation within the construction sector and is currently working on the following: BIM checkers and assessment, Product Life Management (PLM), Life Cycle Analysis and Production of Eco-Indicators, Monitoring of Buildings and other business opportunities not necessarily related to BIMs and ICTs. Opportunities related to BIM, PLM, LCA and Monitoring are being developed through real case studies in Finland, France and Germany. However, other opportunities not related to BIMs and ICTs are being explored through co-creation workshops with different stakeholder groups supported by ecobim networking platform (see Figure 1).

This paper focuses on the findings of the methodology followed in the workshops to develop eco-innovative services for social development and their corresponding business models, seen from the perspective of service research theory and in terms of service development.



Figure 1. Opportunities for eco-innovation identified by ecobim project. (Pekka Huovila & Carmen Antuña, VTT).

2 Innovation models

2.1 Innovation systems

Innovation systems analysis has been performed by several authors in recent decades (Freeman, 1987; Lundvall, 1992; Nelson, 1993; Edquist; Johnson, 1997). Currently one of the most well-known international innovation systems is SRI International's *Five disciplines of innovation*® (Carlson, Wilmot, 2006). VTT has also developed its own *3i Innovation System*. Both systems have been analysed for the development of proposals in the ecobim project. SRI International system offers 5 basic starting points for a market success. These five points are:

- Important Customer and Market Needs
- Value Creation
- Innovation Champions
- Innovation Teams
- Organizational Alignment

“Knowing the Important Customer Needs” represents about 50% of SRI Enterprise Innovation Index; although the numerous workshops made with governments, universities and investors have shown that only 10–20% of the key actors have had a clear idea of the customer needs. “Value Creation” is the most important point for SRI International and represents 60% of their Enterprise Innovation Index. The process for value creation of the product or service does not follow a straight timeline, and in the end always a lower value product/service is obtained instead of the desired one. How to measure value creation is critical to business success. Carlson and Wilmot (2006) proposed a series of concepts easy to understand but difficult to perform to achieve business success. One of the concepts is to have a toolbox of best practices, which focus on the customer's needs, both internal and external, that creates using a common language, a set of tools for the value creation in a process to rapidly develop customer value. Few leading companies use these types of practices as an important source of competitive advantage (e.g. Medtronic, IDEO, Baldor, P&G, etc.), but their results are impressive. “Innovation Champions” represents 60% of the Index and the correct choice of Innovative Team 70%. It is very important to choose good partners who have unique capabilities for better value creation. Finally, Organizational Alignment represents another 60% of the Index for a total of innovativeness of 7.56%.

VTT's *3i Innovation System* is similar to SRI International's *Five disciplines of innovation*®, though it is a system based on continuous learning by doing and developing their own Innovation System. The 3 “i” are Identification, Invention and Implementation.

To identify an important need, VTT proposes to use the customer whenever is possible, create a Market Map, target the potential customer segments for the product/service and try to identify the important needs of those. When it comes to inventing or proposing services or products to the customer, VTT considers doing it together with the customers whenever possible. VTT also promotes value creation through the NCBA system, using a unique approach to meet the important needs of the customer, locate the benefits that will result as well as the differentiation between competitors and disruptive elements. Also the implementation phase is meant to be done together with the customer whenever possible. During the implementation, it is considered of major importance to create value for the customer according to the value proposition. It is important to have a champion team and find out if there is a need of support from other organizations to implement the product or service.

2.2 Eco-innovation

Innovation processes have suffered a change since the Earth Summit in Rio in 1992 (Rennings, 2000, 319-320) and accelerated a shift in mentality so that innovation would be used for sustainable development. In 1996 Claude and Peter James Fussler defined for the first time eco-innovation as “*the process of developing new products, processes or services which provide customer and business value but significantly decrease environmental impact*” (Fussler; James, 1966). If the definition of innovation is fairly neutral on the content of change and open to all directions, the eco-innovation goes on a one-way progress through sustainable development. There is a recent European programme, more strictly focused on eco-innovation, namely the Eco-Innovation Action Plan (EcoAP) that pursues also reducing pressure on the environment through innovation within the framework of the Europe 2020 strategy. This programme will help to mobilize financial instruments and support services for small and medium-sized enterprises (SMEs) to improve investment readiness and networking opportunities related to eco-innovation (Triguero et al., 2013, 25).

The eco-innovations can be developed by firms or non-governmental organizations, can be traded on markets or not, their nature can be technological, organizational, social, or institutional (Rennings, 2000, 322). Changes in lifestyle and consumption behaviour (Scherhorn et al., 1997, 16), a shift in the modal split from private car transport toward bicycling or the creation of environmental awareness in firms (Rennings, 2000, 324) could be considered as social eco-innovations.

The need for eco-innovation is increasingly recognised and viewed as becoming even more urgent in a world of a growing population and changing consumption patterns (The Royal Society, 2012), and the construction sector can be considered as one of the most responsible for material and energy consumption and emissions in the environment (Allione, 2007, 1).

“There is limited understanding of how initial new ideas and concepts develop..., and how these ideas become the basis for product development. Moreover, there is little understanding of organisational mechanisms, tools, activities and techniques employed within innovation projects, which enable environmental-specific innovation to arise and commercialise in particular in the early stages of the innovation process”. (Bocken et al., 2014, 44)

After analysing different innovative systems and based on the results of the SRI International’s workshops showing that only 10-20% of the key actors clearly knew which were the customer needs (Carlson; Wilmot, 2006), and that customers are the most important source of innovation (Von Hippel, 1988), it was appropriate to then locate groups of key actors in order to obtain a clear idea of the needs they might have in the construction sector and thus to develop an eco-innovative social service.

For ecobim project, the initial standpoint was that paradigm change towards eco-innovation within the construction sector means more than technological innovation. Systemic approaches including LCA and ICTs are needed to cover social, environmental and economic aspects. Novel business models are needed to create clear advantages for all actors (particularly SMEs) in the value network. Effective and easy-to-use tools are needed for the implementation of the developed model.

2.3 Life cycle of a building

Different phases during the building life cycle may typically have differently defined, even changing objectives, different data management processes and formats, and most of the time they also involve different actors (see Figure 2).

The phases of the life cycle of a building considered by ecobim project are: brief phase, design phase, construction phase, commissioning phase and operation and maintenance phase. These phases are seen to overlap concurrently. Different actors as structured in ecobim project can be seen to contribute to these phases as follows:

- Brief phase: regulators, city planners, professional associations, real estate developers, owners, building occupants, neighbourhood associations, universities and research centres.
- Design phase: engineering and architecture firms and service providers.
- Construction phase: construction companies, system suppliers, manufacturers and services providers.
- Commissioning phase: construction firms, system suppliers, manufacturers, engineering and architecture firms and services providers.
- Operation and Maintenance phase: regulators, city planners, professional associations, construction firms, owners, building occupants, neighbourhood associations, universities and research centres.

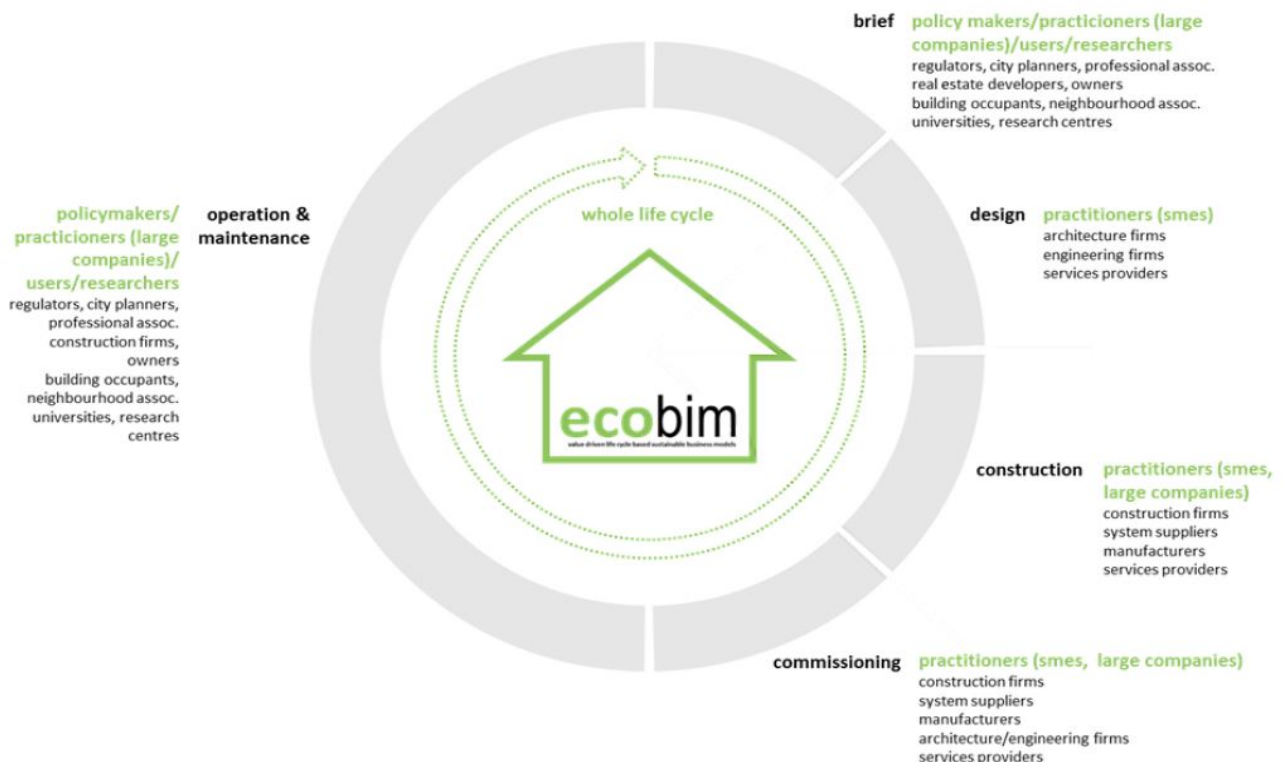


Figure 2. Key actors in the different phases of the building’s life cycle. (Pekka Huovila & Carmen Antuña, VTT).

Results from different research studies show the importance of bringing the environmental concerns at the initial phase or Front End of Eco-innovation (FEEI) process (Bocken et al., 2014), which for building's life cycle are the brief and design phases, when the parameters are still flexible.

Eco-innovative business models as identified in ecobim at this stage may address different life cycle phases, e.g. BIM checkers in design, PLM in construction, LCA and indicators in commissioning, monitoring during operation and maintenance, but all of them could be considered already in the brief phase. It is also important to keep seamless continuity of data management across phases and actors. Core indicators assist in succeeding with this challenge.

2.4 Business model development

The construction sector is traditionally focused on minimizing the investment costs of buildings at an acceptable quality level, primarily regulated by authorities from the health and safety aspects, instead of maximizing the value over service life, i.e. improving the performance against whole life costs and environmental impacts. This leaves very little space for innovation if the client's business model focuses on competing who delivers "the same product" at a lowest price.

When agreeing on the definition and defining aspects of business models in ecobim context, one may use well-known approaches for the development, such as business model canvas by Osterwalder (Osterwalder et al., 2005, see Figure 3) that was used in ecobim workshops.

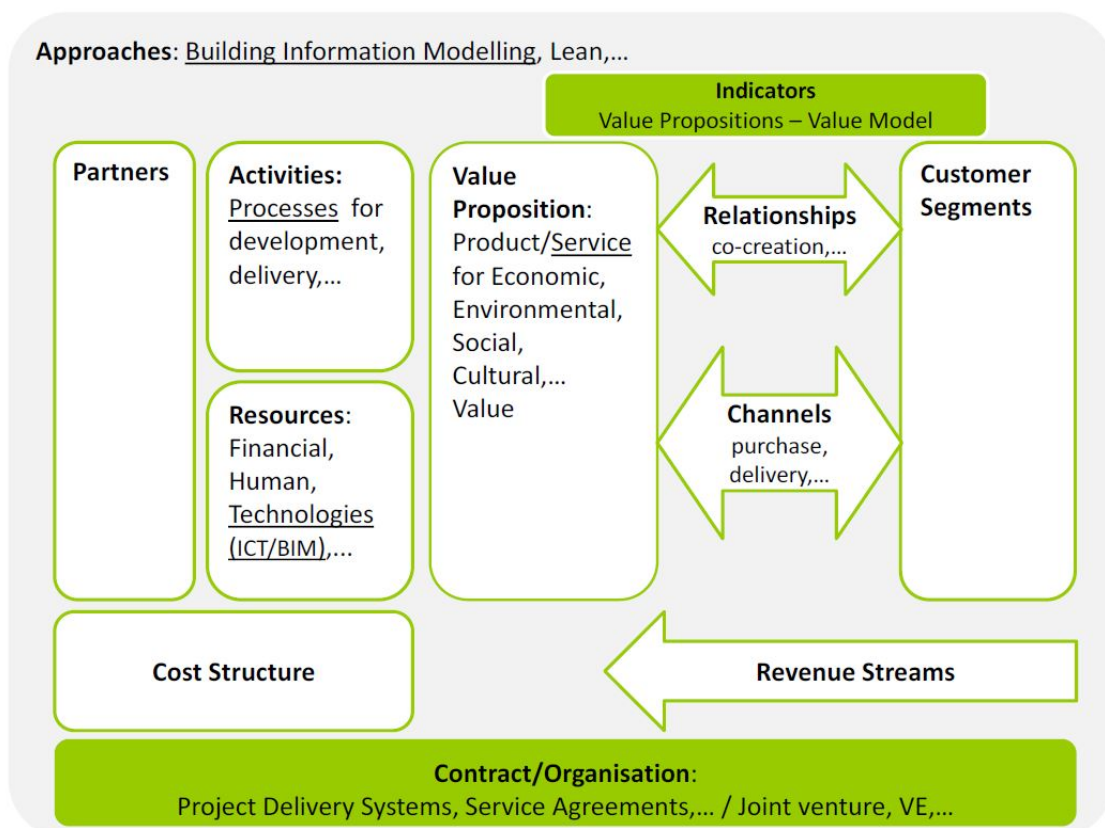


Figure 3. ecobim focus on business model canvas (adapted from Osterwalder & Pigneur, 2010).

In the core of the business model canvas method is the value proposition that explains how the service provider aims to solve a problem of its customer with a given service, fulfil a need or create value. However, how to prove that such value would be created with the given service and how to monitor if such value is actually created is often a more difficult task. Such methods are needed to promote service providers that are willing to provide services that help to achieve higher performance than the minimum requirements or that promote life cycle approach instead of only short-term profits. Huovila, P. et al (2013) propose a more thorough analysis of what value actually is in construction projects and how it manifests and can be verified at different phases (see Figure 2) of building's life cycle. Performance indicators can be used to promote the value to be created and to monitor at later stages to which extent the promised value is actually achieved. That approach is also adopted in ecobim project. In order to create true benefits to all committed value network actors, the value propositions need to be written in the contracts in a construction project. Performance indicators help assessing the value propositions in different procurement models spanning up to life cycle contracts (Huovila, P., et al., 2013). Such approach should be part of future construction business models of different service providers to promote sustainable and profitable construction business development.

2.5 Principles of service development

The change from goods based manufacturing economy to service oriented economy – that has been called “servitization of business” (Vandermerwe & Rada, 1988) – is a trend that has been seen since long time. Goods suppliers become service providers and services account already for around 70% of total employment in Europe (Pro Inno Europe, 2010; Kettunen et al. 2012). In the core of the new way of doing business is the customer instead of the product. Companies tend to outsource their upstream activities (e.g. sourcing, production, logistics) and network with key partners. The downstream activities, instead, are becoming the main source of competitive advantage. The main focus of today’s successful companies is on customers’ needs and the company’s position relative to customers’ purchase criteria. The competitive advantage is often embedded in the processes for interacting with customers, in marketplace information, and in customer behaviour. (Dawar, 2013, 100-102) For services this trend means a shift from “operand resources” (value in property) to “operant resources” (value in use) (Kettunen et al., 2012, 26). For companies the change from goods provision to service provision is huge since services are about facilitating and supporting a customer’s everyday processes, and through that the customer’s goals in life and in business in a value creating way, i.e. helping customers to successfully reach their goals (Grönroos, 2012).

Service science aims to create a basis for systematic service innovation (Maglio & Spohrer, 2007, 18). A key foundation (Kettunen et al., 2012, 26) underpinning the previously mentioned customer and value oriented business logic for services is Service-Dominant-Logic (SDL) (Vargo & Lusch, 2004; Vargo, 2009). SDL theory explains why and based on which principles today’s economy and society are concerned with exchange of services rather than goods. Being widely acknowledged, this theory is used here as the premise for service development. In this approach value is co-created with customers and partners instead of the company marketing to the customer. According to Vargo (2013, 9), service-driven innovation provides input into customers’ value-creation processes by linking firm-available resources to peoples’ purposes. Innovation is then about finding novel and useful ways of enhancing own value co-creation activities by participating in ecosystems through resource integration and service provision to assist other actors in their value-co-creation (Vargo, 2013, 10).

SDL is based on ten foundational premises (FPs) (Vargo, 2009, 375):

1. Service is the fundamental basis of exchange.
2. Indirect exchange masks the fundamental basis of exchange.
3. Goods are distribution mechanisms for service provision.
4. Operant resources are the fundamental source of competitive advantage.
5. All economies are service economies.
6. The customer is always a co-creator of value.
7. The enterprise cannot deliver value, but only offer value propositions.
8. A service-centered view is inherently customer-oriented and relational.
9. All economic and social actors are resource integrators.
10. Value is always uniquely and phenomenologically determined by the beneficiary.

Most of these premises (FPs 1, 4, 6, 7, 8, 9, 10) have guided the approach taken in the different ecobim project’s co-creation workshops to develop social services together with end-users (see chapters 4-5). Citizen involvement and collaborative workshops have lately proven to be successful (if not necessary) methods in urban service development and innovation (Ahvenniemi et al. 2013; Huovila, A. & Nykänen, 2013).

A method that has inspired the approach used in ecobim workshops is Service Blueprinting which is commonly used in service innovation (Bitner et al., 2008). It is a practical method to concretely analyse the service interface from the customer’s point of view. In ecobim workshops, the participants started by defining user profiles. After that customer journeys (Nenonen et al., 2008) were developed for the user profiles in order to understand the aims, frustrations and needs related to different service interfaces during a typical day.

3 Co-creation workshops around eco-innovation: from idea to business models

In order to discover other business opportunities for eco-innovation, ecobim project has organized a number of co-creation workshops in Finland and Germany in collaboration with the following partners:

- White Lobster GmbH (Germany), an agency for sustainable communication based in Berlin. **Workshop 1**
- ARTOVA (Finland), a very active neighbourhood association based in Helsinki. **Workshop 2**
- Mattliden School in Espoo (Finland), interested in introducing sustainable development as part of their curricular activities. **Workshop 3**
- SYKE (Finland), the Finnish Environment Institute. **Workshop 3**

The aim of the workshops was to identify and map opportunities for eco-innovation and social development. The ideas proposed were discussed and categorized. The most promising ones were further developed into eco-innovative services along with the corresponding business models, including the definition of business model canvases. The stakeholders taking part in the workshops represent ecobim’s main target groups:

- Policy makers, practitioners (SMEs and large companies) and researchers. **Workshop 1**
- Users. **Workshops 2 and 3**

Workshop 1 was conducted in several phases, face to face and online, and supported by an e-networking platform. Workshop 2 was carried out in two evenings (from 17.00 to 21.00) with the same participants, whereas Workshop 3 was carried out in one day (from 8.15 to 14.30). In Workshop 1 some of the participants already knew each other, in Workshop 2 none of the participants knew each other and in Workshop 3 all the participants knew each other.

3.1 Co-creation set-up

As already explained, the aim of the workshops was to identify opportunities for eco-innovation and social development within the built environment leading to new services that in turn would lead to new businesses. Preparatory discussions with ARTOVA, ecobim project's collaboration partner for Workshop 2, focused the attention on the importance of social development and the potential offered by this area based on their experience. Linking social development and eco-innovation was perceived as a novel approach capable of yielding promising results and therefore worth trying through the workshops.

For the sake of consistency and comparison, the three workshops followed the same set-up with slight variations in relation to the content and the programme. The common steps shared by the three workshops were:

- Presentation of ecobim project's objectives
- Introduction of the participants
- Description of the programme and objectives of the workshop
- Definition of user profiles
- Definition of customer needs through customer journeys
- Service idea selection through identification of common needs
- Business model canvas for the selected service idea (see Figure 4)
- Eco-innovation in the service provision

Variations related to the content

- Workshop 1 focused on the sustainable neighbourhood of the future trying to identify existing gaps for sustainable social development and eco-innovation.
- Workshop 2 focused on innovative services, businesses and spaces for social development that are environmentally friendly and economically viable.
- Workshop 3 focused on the development of eco-innovative services specifically for the youth.

Business model canvas for:

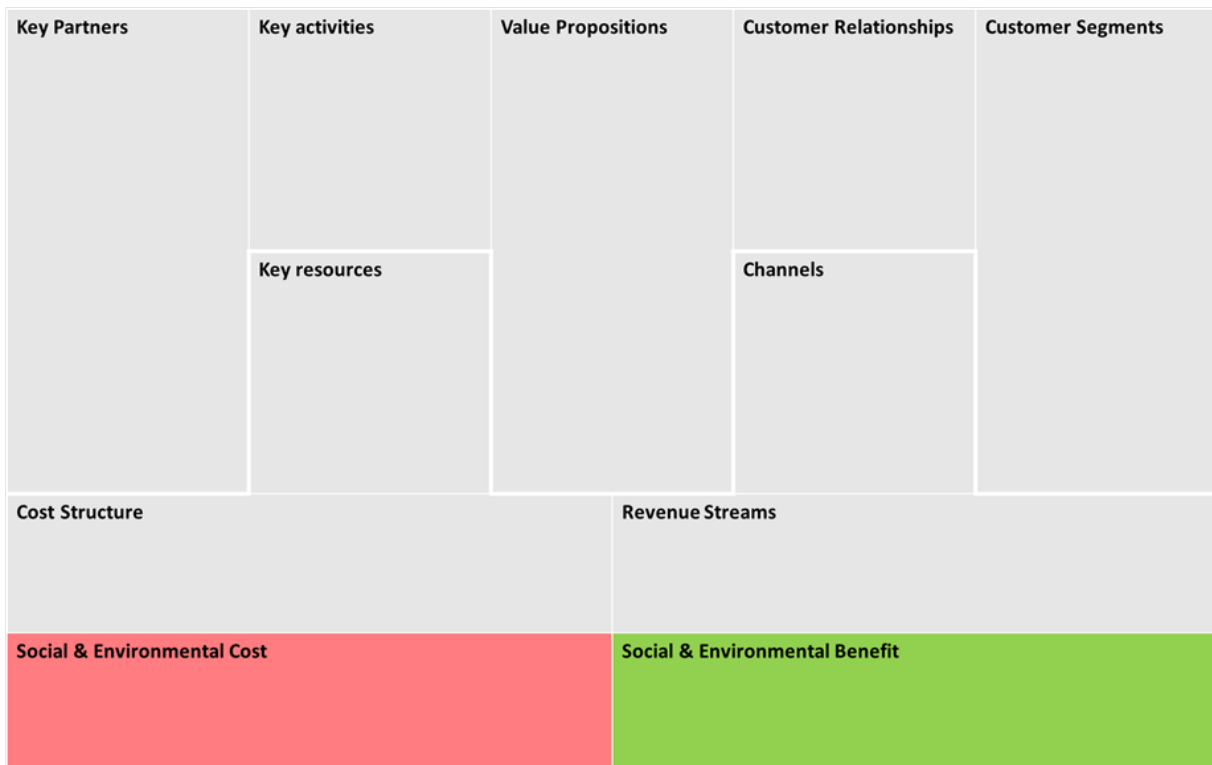


Figure 4. Osterwalder's business model canvas adapted for ecobim project to include social & environmental costs and benefits of the service (Aapo Huovila & Carmen Antuña, VTT).

Variations related to the programme

- Workshop 1/Phase I included the development of the showcase outline previous to the definition of the user profiles. Phase III included development of services and businesses within a sustainable neighbourhood so that the different user profiles or professionals acted either as service provider or customer.
- Workshop 2/Evening 1 included the description of the participants' ideal neighbourhood in terms of personal, social and physical structure. Workshop 2/Evening 2 included a final discussion about opportunities for research on social innovation.
- Workshop 3 included a final group discussion about the developed businesses and their feasibility. In this case, the customer journeys were described through a very detailed day schedule and track-mapping of the user profiles defined.

3.2 Practical realization

The differences in the practical realization of the workshops depended on the different number, background, age of the participants and their availability:

Workshop 1

- Developed in 3 phases: Phase I face to face in Espoo; Phase II online through Owela for ecobim networking platform; Phase III face to face in Berlin.
- 6 participants in Phases I and II from the Ministry of the Environment (policy maker), minigram Studio für Markendesign GmbH (SME), VVO Group Plc. (large company), YIT (large company), VTT (researcher) and Aalto University (researcher), and 5 participants in Phase III from VTT (researchers), White Lobster GmbH (SME), Ingenieurbüro Trinius GmbH (SME) and Federal Ministry of Education and Research (German research funding organisation) / ECO-INNOVERA (European research programme) (policy maker).
- Phase II online allowed the participants to review and refine the user profiles defined in Phase I, and also to compared them with the research findings of Prof. Marketta Kyttä from YTK Land Use and Urban Studies Group at Aalto University (Kyttä et al.,2013).

Workshop 2

- 7 participants representing the users of different age and professional background.
- Developed in 2 evenings with the same participants.

Workshop 3

- 12 participants from Mattliden School in Espoo (8th and 9th grades). During the first part of the workshop they were divided in 3 groups, and during the second part in 2 groups.
- The user profiles developed were their same age.

3.3 Main outcomes

User profiles

- In Workshops 1 and 2 the definition of the user profiles included: name, gender, age, occupation, story/background, goals and frustrations.
- In Workshop 1/Phase II (online), the user profiles defined were compared against the “tribes” found by Marketta Kyttä’s research on the human aspects of urban planning and the methodology of participatory planning. Those “tribes” were the Neighbourer, the Busybody and the Homebody. The user profiles/tribes were also mapped against the developed neighbourhood services by specifying the service provider and the customer.
- In Workshop 3, since the eco-innovative services to be developed were meant for the youth, in particular for teenagers, the definition of the user profiles was slightly different and included: name, gender, age, family, type of house (the family lived in), living neighbourhood and hobbies.

Customer journeys

- In Workshops 1 and 2, the goals and frustrations of the user profiles defined were used to determine the services that those user profiles could need or provide.
- In Workshop 3, the definition of the customer journeys consisted of a typical day of the user profile described hour by hour focusing on the itinerary followed, services used and problems encountered. Positive and negative feelings related to the activities described in the customer journeys.

Service idea selection

- In Workshop 1, one service idea was selected for further development.
- In Workshop 2, two service ideas were selected for further development, one of them being particularly promising. Given their numerous touch points, it was decided to combine them in one service idea.
- In Workshop 3, two service ideas were selected for further development.

Business model canvas

- All the service ideas selected were developed further through Osterwalder’s business model canvas adapted for ecobim project (see Figure 4).

4 Lessons learned

Participants

- Finnish participants in Workshop 1 knew each other beforehand and even collaborated in the past at some point. However, the interaction with the German participants attending the workshop, who brought a different perspective, enabled a “new” approach towards “old” problems.
- Workshop 2 gathered a quite heterogeneous group of users in terms of age, origin, personal and professional background, etc. As a result, the discussion leading to the definition of user profiles and customer journeys was full of nuances and in-depth analysis. The good atmosphere created among the participants helped the communication.
- Workshop 3 was carried out with a group of teenagers, not typically chosen for this type of workshop. Even though (or perhaps due to) they were not familiar with the substance of ecobim project or some concepts related to the tasks they were asked to perform, they were not scared by the challenge and showed great willingness to contribute. They clearly valued their opinion being heard.

User profiles and customer journeys

- In all the workshops, the definition of user profiles and customer journeys was very detailed and showed considerable observation skills and understanding of the motivations of different types of customer groups. This was even more the case of the students taking part in Workshop 3.

Service ideas

- The service ideas selected for development seem to respond to clear gaps in social development.
- Enormous eco-innovation potential can be unlocked through collaboration with non-experts, normal users, different age groups, etc.
- Developing solutions “together with” instead of just “for”, or even worse “despite of” those affected by them, may be a better way to solve complex problems in the future. This approach should be more consistently used by companies, policy makers and researchers.

Business models

- Workshops 1 and 2 proved the difficulty of finding the right business models for the novel service ideas developed. This coincides with Curt Carlson’s opinion. When discussing innovation, the CEO and President of SRI International believes that the stress should be on sustainable business models. In his own words “people have lots of ideas and those ideas morph and go through transformations. Oftentimes the hardest part is coming up with that business model” (Carlson & Mark, 2013).
- The young participants in Workshop 3 (14 and 15 years old) showed a fresh approach to all the tasks, and succeeded even when developing the business models for their selected service ideas.

Acknowledgements

ecobim project team wishes to thank all the participants and partners that have collaborated in the realization of the workshops.

Workshop 1

- Co-organizer and facilitator: Nils Bader, Managing Director at White Lobster GmbH (Germany)
- Participants: Holger Grünwald, Scientific Officer Responsible for Research on Eco-Innovation, Projektträger Jülich; Harri Hakaste, Senior Architect at the Ministry of the Environment (Finland); Samy Hamadeh, Managing Director at Minigram Studio für Markendesign (Germany); Juha Kostiaainen, Senior Vice President for Urban Development and Corporate Relations at YIT Corporation (Finland); Marketta Kyttä, Associate Professor in Land Use Planning at Aalto University School of Science and Technology (Finland); Niina Savolainen, Research Manager at VVO Group Plc (Finland); Wolfram Trinius, Managing Director at Ingenieurbüro Trinius GmbH (Germany)

Workshop 2

- Co-organizer: Janne Kareinen, Manager at ARTOVA (Finland)
- Participants: Rob van der Capellen, Software Engineer at eCraft Oy (Finland); Álvaro Corredor Ochoa, Research Assistant at SYKE (Finland); Anna-Kaarina Kairamo, Training Manager at Aalto University (Finland); Anna Kääriäinen, Owner at Vilnis (Finland); Riitta Korhonen, Geologist emerita at Geological Survey (Finland); Lassi Raunio, Teacher in Adult Education (Finland); Kristina Westerholm, Safety Coordinator at City of Helsinki (Finland)

Workshop 3

- Co-organizers: Álvaro Corredor Ochoa, Research Assistant at SYKE (Finland); Susanne Bergström-Nyberg, Teacher at Mattliden School (Finland); Katja Wide, Teacher at Mattliden School (Finland)
- Participants: Victoria Ahlstedt, Kristina Causton, Anna Helin, Maria Krogus, Lola Lerche, Johanna Lindstedt, Valmire Mlinaku, Nathalie Nyström, Frida Oinonen, Amanda Porko, Sabina Siren, Maria Trendafilova, Benina Uotinen. All students at Mattliden School (Finland)

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Speed of New Service Development among Finnish ‘low-tech’ SMEs

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This explorative study examined aspects of speed of New Service Development (NSD) in ‘low-tech’ service SMEs. Focal questions were how these companies perceived service development speed and the impacts of accelerated NSD. A parallel research topic was how these firms used Service Design tools and methods in their service development activities. 300 respondents from Finnish SMEs participated in the study through a telephone survey. The findings give insight on how speed in New Service Development is perceived among Finnish ‘low-tech’ SMEs. Some indicative advantages and disadvantages of accelerated NSD were identified. Potential enablers for accelerating NSD were recognized. Utilization of Service Design was found to be low among the majority of respondents.

1 Introduction

Services have an essential role in the global economy. For example in the European Union, services contribute to 73.5% of the total gross value (EU-28 in 2013; Eurostat, 2014) and in Finland to 70.4% (preliminary data for 2013; Statistics Finland, 2014). A majority of service businesses are small and medium-sized enterprises (SMEs) that, according to the EU definition, employ fewer than 250 people and have an annual turnover below 50 million euro. For example in Finland in 2009, 94% of service sector firms had less than 10 employees each, and these firms employed 27% of the service sector workforce (Statistics Finland). Competition on the market is an apparent driver for the firms to continuously renew their current service offering and to develop entirely new services.

New Service Development (NSD) has been defined as the process of making of service products that are new to the supplier (Johne; Storey, 1998). According to Umashankar et al. (2011), accelerating the design process is a primary means for obtaining competitive advantage in NSD. Accelerating the speed of service development could have an impact for example on the time-to-market, responsiveness to customer needs, quality of service, development costs, cash flow, profitability, and the firm’s innovation capability (some similar outcomes of development speed in New Product Development have been proposed by Cankurtaran et al., 2013). If NSD is successfully accelerated, or even attempted to be accelerated, it will no longer be ‘business as usual’ for the firm. Obviously, the impact can be different – positive or negative – in the short run (e.g. immediate cash flow during accelerated service development work) than in the long run (e.g. annual profit).

When considering it on a generic level, service development can be accelerated by service suppliers, for example, by investing more resources (e.g., amount of working hours, number of people working simultaneously or consecutively during a day on the development activity, assigning the firm’s top talent on the work), or performing some steps of the service development process (e.g. ideation, prototyping, testing, iterating) in less time than previously, by skipping some of the steps altogether, or by progressing between the steps faster than previously (i.e. leaving less time to reflect on the learnings from each previous step).

Against this background, we are interested to explore how speed in NSD is perceived by ‘low-tech’ service SMEs. Such focus is most relevant as the majority of service sector firms are SMEs delivering long-established services like hospitality, maintenance, and construction. Following Hirsch-Kreinsen et al. (2003), we base our definition on ‘low-tech’ service suppliers on the OECD classification, which defines industries that have an R&D/Turnover ratio of less than one per cent as ‘low-tech’ (see also Nuns et al., 2010). Following den Hertog et al. (2011), we emphasize that ‘low-tech’ does not imply that the firms would be low in innovation so they wouldn’t be able to develop services innovatively. For instance, den Hertog et al. (ibid.) found many examples of innovative entrepreneurship in the ‘low-tech’ hospitality service business they studied. ‘Low-tech’ SMEs have no (or have very small) formalized Research & Development operations (e.g., personnel dedicated to R&D activities) for service development, so New Service Development is done in parallel with the daily operations of supplying the current service offering.

Service Design (SD) is an emerging discipline, which offers practical tools and methods that can assist the development of new services and the renewal of existing services. There is some indication that SD tools such as service blueprinting have the potential to speed up future service innovations (Bitner et al., 2008). On the other hand, if the service development activities in a firm have been incrementally developed to perfection over the years (e.g. when the company has little employee turnover or when the supplied service is of a very specific nature), the introduction of formal SD tools and methods may not accelerate the NSD process in a firm. Case studies on successful Service Design projects describe the use of SD tools by ‘high-tech’ companies or the public sector, or their use in the development of services that have digital/online service elements as major component (e.g. Meroni; Sangiorgi, 2011; Enninga et al., 2013). However, there has been little research in to what extent Service Design tools and methods are utilized in long-established service areas where IT-elements have no role or play just a minor role (e.g. in the online promotion of the service).

The intent of the study presented in this article is twofold. First, we want to explore how Finnish ‘low-tech’ service SMEs perceive the factor of speed in New Service Development, and how they see the possibilities and consequences of accelerating their service development activities. Second, we want to explore to what extent the potential of the Service Design discipline is used by these firms in their NSD activities. To better understand the responses, we also inquire about the current market circumstances the firms operate in.

The structure of this article is as follows. In Section 2 we summarize previous research on Service Design, and speed as a factor in New Service Development. In Section 3 we present the methodology of this study, followed by the presentation of results in Section 4. In Section 5 we discuss the findings and their possible implications, and wrap up the paper with conclusions presented in Section 6.

2 Previous research

New Service Development has been defined by Johne and Storey (1998, 185) as “[...] *development of service products which are new to the supplier*”. Following this definition, the scope of NSD activities also includes renewing (e.g., augmenting or streamlining) an existing service or its delivery (Johnson et al., 1999). Froehle et al. (2000) argue that NSD is vital to success in service operations, so the factors contributing to NSD speed and effectiveness must be completely understood and better implemented by the service firms.

In their study on the enablers of NSD effectiveness in 182 U.S. service firms (of which 28% had fewer than 200 employees and thus constitute as SMEs), Froehle et al. (2000) found that formalized NSD processes indirectly influenced a firm’s ability to develop new services by increasing the speed of NSD. Additionally, the researchers found that a firm’s IT sophistication (in terms of facilitating communication and feedback, reducing error and redundancy, and streamlining the service design process) directly effected the speed of NSD. Froehle et al. found strong positive relationship between the speed of NSD process and the general effectiveness of the firm’s NSD efforts. However, the researchers emphasise that the general effectiveness of NSD is influenced also by other factors such as product strategy, project definition, and clear organizational roles. Froehle et al. conclude that speed does aid a firm’s NSD initiatives, but speed should not be the firm’s single development goal. (Froehle et al., 2000.)

Development speed has been one focal point in the field of agile service development of ‘service systems’ that combine IT and business elements (Lankhorst et al., 2012), in other words, in the development of ‘digital’, ‘online’ or ‘Internet’ services. A related concept is Rapid Service Development, which Janssen & Steen (2001) describe as an engineering methodology for developing e-business services. Lankhorst et al. (2012) describe agile service development as a solution for service development organisations to tackle the increasing speed of change in the business environment. According to Lankhorst et al. (ibid.), an agile service is a service that has the ability to rapidly accommodate changes. Lankhorst et al. (ibid.) address three kinds of agility, namely ‘Business agility’ (aiming for faster time-to-market, more effective partnering strategies, decreased development costs, increased customer satisfaction, and using change as an essential part of the firm’s strategy), ‘Process agility’ (using agile practices for design and development, placing focus on people and interactions, aiming for more rapid value delivery and improved responsiveness to change) and ‘System agility’ (aiming for organizational and technical systems that can be more easily reconfigured when necessary). Agile service development practices have been developed for and their use have been studied in the context of ‘service systems’ (i.e., ‘online’ or ‘digital’ services), and as far as the authors of this article are aware, the use of agile practices have not been studied in the context of ‘traditional’ service development or by ‘low-tech’ service firms. Thus, there is a lack of understanding of how development speed and the possibility of accelerating NSD are perceived by ‘low-tech’ SMEs.

Service Design is a rapidly emerging discipline that is argued to have a great potential to make an impact in the development of new services (Tether, 2008). Service Design involves systematically applying design methods and principles to the design of services (Holmlid; Evenson, 2008). Johnson et al. (1999) differentiate SD from NSD by suggesting that Service Design involves specifying the detailed structure, infrastructure, and integration content of a services operations strategy, while NSD refers to the overall process of developing novel service offerings. Holmlid and Evenson (ibid.) argue that the Service Design discipline should be viewed as complementary to service development, as SD activities take place throughout a service development process. Ostrom et al. (2010) suggest that the design of a service can have a significant impact on key metrics, such as costs, revenues, customer satisfaction and brand perceptions of the firm supplying the service. Service Design practices have been widely applied in different service sectors (Mager, 2009).

The research of Service Design has begun to take shape (Kimbell, 2011). The body of literature on SD draws on contributions from multiple research fields, such as service marketing (Shostack, 1982), innovation management (Bessant; Maher, 2009), service operations management (Goldstein et al., 2002), and New Service Development (Bitner et al., 2008). SD research literature describes a variety of practice-oriented tools and methods that can be utilized in the different phases of service development, e.g., service blueprinting (Shostack, 1984), customer journey (Kimbell, 2011), storyboarding (van Oosterrom, 2009), touch-points (Clatworthy, 2011), exemplars (Blomkvist; Holmlid, 2009), and service prototyping and piloting (Neyer et al., 2009; Passera et al., 2012). Rontti et al. (2012) have developed a service prototyping laboratory (‘SINCO’) that collects a variety of SD tools into a holistic approach to designing services. Another service prototyping and simulation environment is ‘ServLab’ (Meiren; Burger, 2008). Miettinen and Koivisto (2009) have collected several viewpoints on how design thinking and innovative methods work as tools for developing

services in co-creation with users. In addition to research literature, several practical books on Service Design have been published, for example, by Curedale (2013) who summarizes around 250 SD tools and methods. Furthermore, established idea generation and organizing tools and techniques, such as mindmap and affinity diagram, can be used in Service Design. Thus, there is a good availability of “pen and paper”-based SD tools, IT-based SD tools, and conceptual SD tools and methods, but an interesting – and so far largely unaddressed – question is to what extent these tools are used in practice by ‘low-tech’ service SMEs?

Increasing the speed of NSD and utilizing Service Design can be a means for a firm to pursue competitive advantage; in other words, to derive profit by setting up a strategy for providing value to customers that is not used by competitors. As addressed by Weerawardena and McColl-Kennedy (2002, 14), “[c]ompetitive advantage grows out of the way a firm organises and performs discrete and connected activities of the value-chain.” Competitive advantage can be gained by creating superior value for customers, and can be achieved by performing service delivery related activities in an innovative manner. When competitors are unable to duplicate a firm’s value-creating strategy, the firm can achieve sustainable competitive advantage. Weerawardena and McColl-Kennedy (2002)’s capability-based model of NSD suggests that to obtain sustained competitive advantage, a service firm should build up distinctive capabilities that enable it to perform organizational routines for delivering services in a way that outperforms competitors. A firm’s value-creating strategy may involve accelerating the speed of and/or utilizing Service Design in its service development and delivery. Ways of speeding up service development and using SD tools and methods in NSD can be a part of a firm’s distinctive capabilities. Thus, we want to examine how Finnish ‘low-tech’ SMEs perceive the possibility of accelerating NSD as a source for obtaining competitive advantage, and how beneficial they see Service Design for their business.

3 Methodology

We developed an exploratory survey to collect data on ‘low-tech’ service SME businesses’ perceptions on the various aspects of speed in New Service Development. Additionally, we set out to collect data on how aware the firms were of the potential of the Service Design discipline and how beneficial they considered SD for their business. The survey included both quantitative (multiple selection) questions and qualitative (open-ended) questions for more in-depth data capture.

We explored the following three main topics through the survey:

1. *Respondents’ current circumstances*: respondent firms’ background; market situation; seek for growth; current speed and frequency of NSD; use of systematic design processes in NSD; use of service trials and seeking learning from the trials in NSD; use of specific tools and methods in NSD.
2. *Outcomes of accelerated NSD speed*: respondents’ perceived competitive advantage obtained from faster time-to-market; business impacts of halving the current speed of time-to-market; enabling criteria for accelerating NSD; disadvantages of accelerated NSD.
3. *Utilization of Service Design in NSD*: respondents’ awareness of the potential of Service Design; availability of internal SD competence; use of external SD competence; perceived favourability of SD for business; SD tools and methods used by the respondents in service development.

The survey was implemented between March and April 2014 as a series of telephone interviews of employees representing ‘low-tech’ service SMEs residing all over Finland. Potential respondents were chosen randomly from an enterprise database of 1,478 ‘low-tech’ companies employing fewer than 250 people and having annual turnover below 20 million euro. Senior managers at the companies were targeted as respondents. Altogether 487 people from these firms were contacted to participate in the survey. 300 people representing different firms responded to the survey. 272 of the respondents were CEOs of their respective companies.

4 Results

The results are reported below grouped into the following main topics: Background of respondent firms, Seek for growth, Engagement in New Service Development, Speed of New Service Development, and Utilization of Service Design. Quotes from the respondents have been translated from Finnish to English by one of the authors.

4.1 Background of respondent firms

The 300 respondent firms represent altogether 70 service activities (classification based on the Finnish Standard Industrial Classification ‘TOL2008’; Statistics Finland, 2008). Examples of these service activities include food and beverage services (e.g., restaurants, cafeterias, catering), accommodation, maintenance (of property, motor vehicles), real estate management, cleaning, waste collection, specialized construction (e.g. site preparation), bookkeeping, installation (of electricity, HVAC, industrial apparatus), and retail sales (of motor vehicles, small retail stores).

Most of the businesses operated locally (60.2%) or nationally (29.8%). 85% of the respondent companies had 20–49 employees; 11.3% employed 50–99 people, and the remaining 3.7% had 100–249 employees.

The perceived competitiveness of the markets was as follows. According to 48.8% of the respondents, the markets their firms operate in were aggressively competitive. 43.8% of the respondents described their markets as moderately competitive. Only 7.4% of the respondent companies reported to operate in markets that were marginally competitive.

4.2 Seek for growth

Through a set of three questions, we wanted to find out the respondent firms' drive to seek growth (Figure 1), if the firms have renewed their service development activities (Figure 2), and if the firms have brought new or renewed services to the market (Figure 3).

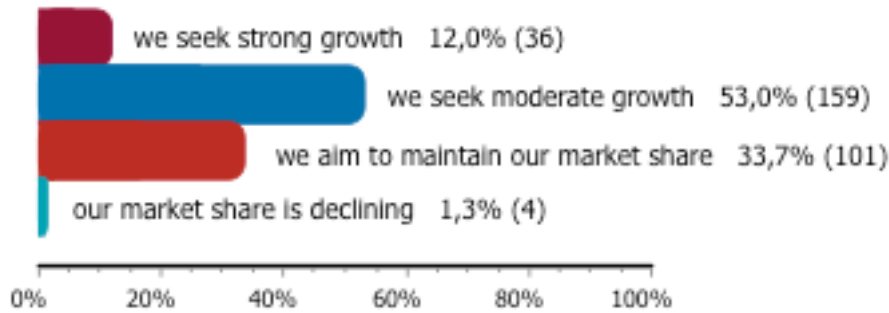


Figure 1. Distribution of responses to the question: "How would you describe your firm with regard to growth?".

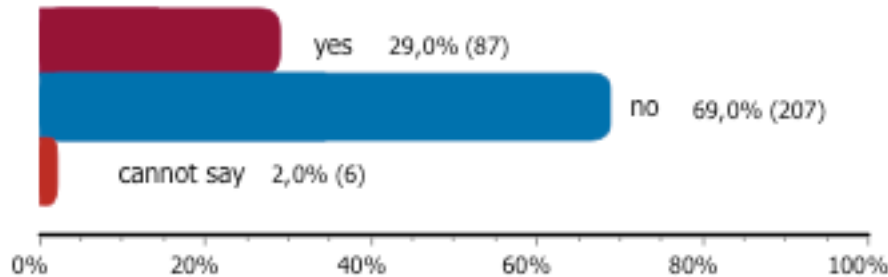


Figure 2. Distribution of responses to the question: "Has your firm significantly renewed its service development activities during the past two years?".

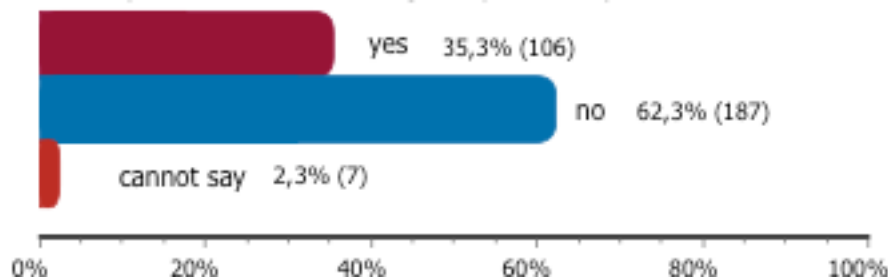


Figure 3. Distribution of responses to the question: "Has your firm brought to the market entirely new or significantly renewed services during the past two years?".

As the data in Figure 1 indicates, nearly two-thirds of the respondents reported that their firms were seeking at least a moderate growth in their business (12% reported to seek strong growth, 53% reported to seek moderate growth). The responses in Figure 2 suggest that around one third (29%) of the businesses were seeking growth by renewing their service development activities. Furthermore, the data in Figure 3 indicates that around one third (35.3%) of the firms have introduced a new or renewed service to the market within the past two years.

On the other hand, 69% of the respondent firms reported to not have renewed their service development activities during the past two years (Figure 2) and 62.3% have not brought any new or renewed services to the market (Figure 3) during the past two years.

4.3 Engagement in New Service Development

An important area we wanted to explore was the respondents' current engagement in New Service Development. To learn about this topic, we devised a pair of questions presented to the respondents as arguments (Figure 4).

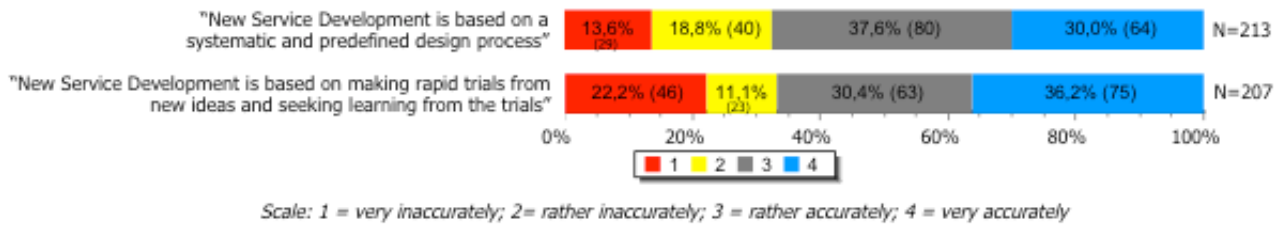


Figure 4. Distribution of responses to the question: "Please estimate how accurately or inaccurately the following two arguments describe New Service Development in your firm." Note that only 213 and 207 study participants responded to these two questions.

Looking at the data in Figure 4, roughly a third of the respondents considered as very accurate the proposed descriptions that NSD in their firms is based on a systematic and predefined design process (30%), and rapidly piloting new ideas and seeking learning from the experiments (36.2%). On the other hand, more than one tenth of the respondents (13.6%) stated that the proposition of NSD being based on a systematic and predefined design process as a very inaccurate description of their firm. More than one fifth (22.2%) of the respondents considered it very inaccurate to describe NSD in their firms as being based on making rapid trials and seeking learning from the trials.

Next, we asked the respondents if their firms used specific tools or methods in the different stages of developing a new service. Their combined responses are reported in Figure 5.

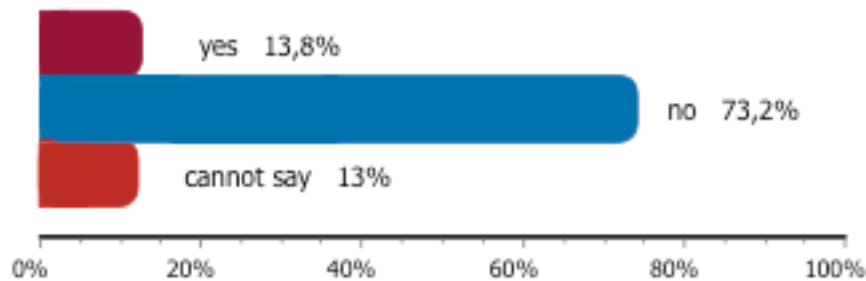


Figure 5. Distribution of combined responses to a set of questions inquiring if the respondent's firm used specific tools or methods when developing new services.

As the responses show in Figure 5, nearly three-quarters (73.2%) of the respondents indicated that they have not used any formal tools or methods when developing new services. Only 13.8% of the respondents reported to have used some specific tool or method. The specific tools and methods the respondents mentioned are reported later in this article.

4.4 Speed of New Service Development

To obtain an overview of the current speed of service development in the respondents' companies, we inquired them about the time it typically takes to develop and introduce a new service to the market (Figure 6).



Figure 6. Distribution of responses to the question: "How long does it typically take your firm to develop and bring a new service to the market?" Note that only 230 study participants responded to this question.

As the data in Figure 6 indicates, the average speed of NSD varied considerably between the companies. For nearly one fourth (23.5%) of the respondents it took less than one month to develop and bring a new service to the market, whereas for more than half (57.4%) of the companies it took between six and twelve months. It should be noted that 9.6% of the study participants responded that it took for them less than a week to bring a new service the market. Thus, New Service Development could be characterized as fast in almost one tenth of the respondent companies.

Next, we asked the respondents if they considered that a shorter time-to-market would bring significant competitive advantage (Figure 7).

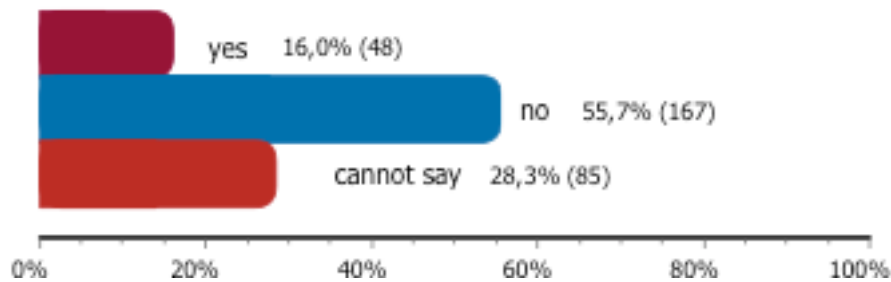


Figure 7. Distribution of responses to the question: “Would a shorter time-to-market bring significant competitive advantage to your firm?”.

More than half (55.7%) of the respondents considered that the possibility of bringing a new service to the market faster than currently would not entail significant competitive advantage to their businesses. A mere 16% of the respondents thought that their businesses would obtain a significant competitive advantage from a faster time-to-market of a new service. Nearly a third (28.3%) of the respondents could not give an estimate on what kind of impact a shorter time-to-market would make on the competitive advantage of their firms.

4.4.1 Business impacts of accelerated NSD

To find out the respondents’ opinions about what accelerated time-to-market speed would entail, we asked them to respond in their own words to the proposition: “If your firm could bring a new service to the market twice as fast as currently, the impact on your business would be...”

Some responses described clear business impacts – both positive and negative – that accelerated service development would make. The most illustrative responses are reported in Table 1. The responses are grouped based on common themes.

Table 1. Example responses to the proposition “If your firm could bring a new service to the market twice as fast as currently, the impact on your business would be...”

Theme	Responses
IMPROVED COMPETITIVENESS	<i>We would get a head start over the other companies (Respondent 52); We would be ahead of the competitors (Respondent 14); Being able to produce a service faster would increase our competitiveness (Respondent 77); Competitors wouldn’t have time to copy [our service] (Respondent 186); It improves notably the competition situation if you are the first on the market. The first one sticks on the minds of people (Respondent 68); It is always good to be the first one on the market, to be the forerunner (Respondent 119); It always improves competitiveness, when you are at the forefront of the development (Respondent 124).</i>
IMPROVED VALUE DELIVERY TO CUSTOMERS	<i>We would be able to better meet customers’ expectations (Respondent 195); Customers would feel increased value towards our business or the product (Respondent 194); Extended service offering for customers is probably the greatest benefit (Respondent 58); The faster services are produced, the faster they provide benefit to customers (Respondent 261, Respondent 285).</i>
IMPROVED CUSTOMER CONTACTS	<i>We would get new customers (Respondent 177); Contacts with customers would be made faster (Respondent 255); [We would get an] extended contact interface to customers (Respondent 295); Customers would get the service faster from us than from other companies (Respondent 130).</i>
INCREASED OPERATIONS	<i>Increased profit (Respondent 4); Faster cash flow (Respondent 7, Respondent 104); Increased revenue (Respondent 39, Respondent 72); Increased production and operations (Respondent 105); Increased sales (Respondent 282); Increased market share (174); Faster growth (Respondent 299); Increase in quality and profitability (Respondent 173); Improved company image (Respondent 122).</i>
FASTER RESPONSIVENESS	<i>We would be able to respond faster to the markets (Respondent 183); The obtained benefit is in being able to react to the situation, so not to fall out of the competition (Respondent 118); A possible benefit is that the service would be brought on time or on the right season (Respondent 97); It would enable faster testing of the new service (Respondent 103); It would diminish the impact of economic fluctuation (Respondent 196).</i>

Theme	Responses
SAVED RESOURCES	<i>It would save resources (Respondent 265); It would free resources for other activities (Respondent 103); If new service models are to be invented, it is for the purpose of seeking cost savings (Respondent 284); Cost savings (Respondent 122).</i>
RENEWAL	<i>Renewal would be faster and it would improve our position on the market. (Respondent 276); The message of renewal could keep up the interest [in our business], when there is something happening all the time. (Respondent 69).</i>

On the other hand, in addition to these positive effects that were mentioned, several respondents considered that faster time-to-market would not be possible in their business or it would not have any benefits. One respondent noted sceptically, “*The turnover would grow, but I doubt if the profit would*” (Respondent 39). Another respondent considered that accelerating service development would imply that the resulting service would be half-baked: “*I see no benefits [in accelerating our service development]. I see just disadvantages if incomplete services are brought to the market.*” (Respondent 251) One respondent considered the service area so established that accelerating service development would make little difference: “*Restauranting is one of the oldest services; I don’t see any benefit in [developing a new service twice as fast].*” (Respondent 44)

Some respondents stated that New Service Development is not even possible in their particular business area, for example: “*In our business [electric installation services] it is difficult to invent anything new.*” (Respondent 290). In addition to electric installation services, other service activities where respondents considered it to be difficult to develop anything new were cafeteria, catering, specialized construction, HVAC installation, and maintenance.

4.4.2 Enablers for accelerating NSD

To find out the respondents’ views on the feasibility of speeding up NSD, we asked them to complete in their own words the sentence: “*Increasing significantly the speed of New Service Development is possible when...*” The most illustrative responses are reported in Table 2. The responses are grouped based on common themes.

Table 2. Example responses to the question “*Increasing significantly the speed of New Service Development is possible when...*”

Theme	Responses
THERE ARE SUFFICIENT RESOURCES	<i>There would be time and money available. And that there would immediately be networks and help available, if there is a lack in own competences (Respondent 55); There would be personnel involved, in other words, resources available (Respondent 180); There are enough of external resources and funding available (Respondent 186); We would get funding (Respondent 196); There would be more time available (Respondent 194); A new service brings expenses and so forth, so would have to make those fit within our activities. We cannot speed up service development without interfering our other activities (Respondent 92).</i>
THERE IS SUPPORT FROM THE ORGANIZATION	<i>The entire organization is involved as effectively as possible (Respondent 178); There is enough know-how, or someone would drive things forward (Respondent 287); The leadership would be more involved (Respondent 189).</i>
DEVELOPMENT WORK IS SYSTEMATIC	<i>It is a systematic activity (Respondent 167); Our development work would be more systematic (Respondent 191); Our other activities would better organized (Respondent 163); When we are able to make rapid decisions (Respondent 159).</i>
CUSTOMERS ENABLE IT	<i>When there are good interactions with and trust in our customers (Respondent 192); When our businesses customers are able to move faster (Respondent 164).</i>

In addition, the following enabling criteria for accelerating New Service Development were mentioned by at least one respondent: “*When a good idea [for the service] has been identified*” (Respondent 4); “*When there is an acute need for the new service*” (Respondent 59); “*When we find new ways to operate*” (Respondent 176).

4.4.3 Disadvantages of accelerated NSD

To learn about the respondents’ insights on the possible disadvantages of accelerated NSD, we asked them to complete in their own words the sentence: “*The most significant disadvantage of increasing the speed of service development is that...*” The most illustrative responses are reported in Table 3. The responses are grouped based on common themes.

Table 3. Example responses to the question “The most significant disadvantage of increasing the speed of service development is that...”

Theme	Responses
MISTAKES MAY BE MADE	<i>Rush introduces easily mistakes (Respondent 106); When developing services, the faster you proceed, the more things get unnoticed. You cannot see the disadvantages, if you do development work in a too short time frame (Respondent 114); Grave mistakes may be made. There are so many stakeholders to consider, so the risks grow considerably (Respondent 273); Perhaps there would be rushed judgements and something unconsidered (Respondent 118); If it is not studied carefully, it may turn out to be a bad investment (Respondent 270); We might do hasty decisions (Respondent 4); My only concern would be if every angle or opportunity will be considered (Respondent 265).</i>
THE SERVICE MAY BE INCOMPLETE OR OF INFERIOR QUALITY	<i>Based on my experience, very quickly produced services do not work. Their functionality is not as good as in services that have been developed for a long time and have been tested (Respondent 37); An untested service would bring lots of problems, if it is brought to the market too quickly (Respondent 41); The service would be incomplete (Respondent 252); The service may not be complete and tested (Respondent 14); The service may not be of high quality (Respondent 22, Respondent 269); The service has to be perfect, before it is ready for launch (Respondent 26).</i>
IT MAY HURT CUSTOMER SATISFACTION	<i>Getting current customers accustomed to new services is the greatest challenge (Respondent 69); When the quality does not meet customer expectations (Respondent 87); It hurts customer satisfaction (Respondent 27); When incomplete service models are introduced, they disrupt the clientele (Respondent 44); When you cannot be sure what the customers want (Respondent 188); An adverse effect is getting the service to the market and how customers will react to it (Respondent 254).</i>
WORKFORCE AND PROCESSES ARE DIFFICULT TO ADAPT TO ACCELERATED SPEED	<i>How to get the personnel involved (Respondent 176); When the personnel cannot embrace it (Respondent 266); How to keep the personnel on par with in the change: through information and learning (Respondent 72); When the organization is inflexible (Respondent 189); Getting our processes into the new service is the biggest challenge, as well as adapting with the other service producers (Respondent 59); The structures of old services are hinders (Respondent 93); When old attitudes slow things down (Respondent 178); When we have to move ahead within the schedule given by a customer (Respondent 164).</i>
IT REQUIRES EXCESSIVE RESOURCES	<i>Getting workforce is the greatest challenge (Respondent 58); Resources, because we are a small firm (Respondent 123); It takes away from own personnel resources (Respondent 173); Resourcing is the most significant challenge (Respondent 38).</i>
IT BECOMES EXPENSIVE	<i>Expenses get out of hand (Respondent 167); It is expensive (Respondent 170); It increases expenses (Respondent 235); Expenses are of course always the gravest adverse effect (Respondent 84).</i>

Additionally, one respondent operating in waste collection services provided an interesting comment concerning the disadvantages of accelerated NSD: “Our business is based on public fares. If new services are introduced to the market too rapidly, the public authorities defining the fares cannot keep up because the fare adjustments are made annually. This causes misunderstanding and confusion, and causes problems in market communication. Furthermore, we wouldn’t have time to induct the employees sufficiently.” (Respondent 122). This response gives an example of the external complexities of introducing new services at accelerated speed: if the service fees are based on public fares, then the authorities have to keep in pace with defining fares for the new services.

4.5 Utilization of Service Design

To begin exploring the topic of utilization of Service Design in the respondent firms, we first inquired the respondents’ awareness of the potential that the Service Design discipline may have for them (Figure 8).

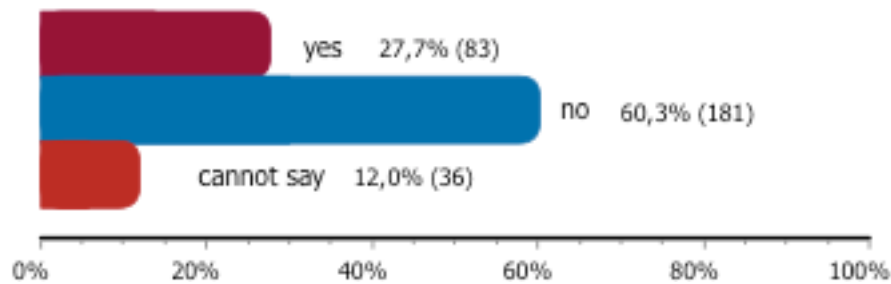


Figure 8. Distribution of responses to the question: "Are you aware of the possibilities of Service Design?"

Looking at the data in Figure 8, it appears that the potential of the Service Design discipline was not well known in the surveyed SMEs: almost two-thirds (60.3%) of the respondents reported to be unaware of the possibilities. 27.7% of the respondents reported to be aware of the possibilities of Service Design.

Next, we inquired about the internal Service Design competence (Figure 9) and the use of external Service Design competence (Figure 10) in the respondent firms.

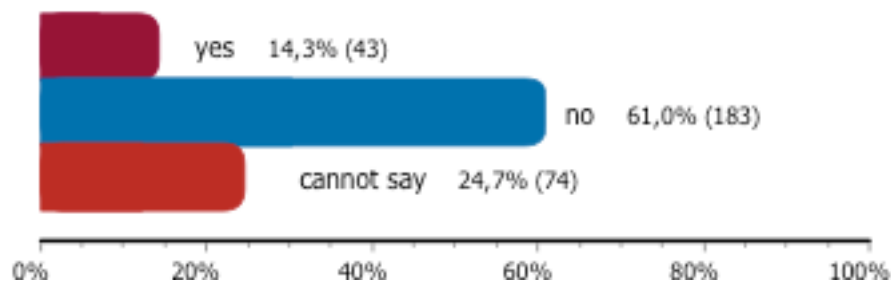


Figure 9. Distribution of responses to the question: "Does your firm have internal competence in Service Design?"

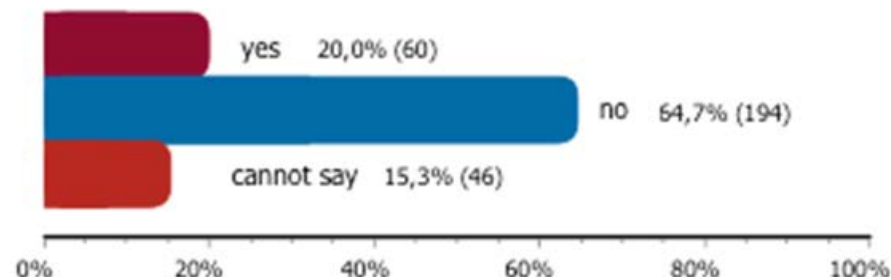


Figure 10. Distribution of responses to the question: "Has your firm used external Service Design consultants?"

As the responses indicate, the potential of the Service Design discipline was not broadly utilized in the surveyed SMEs: just 14.3% of the companies reported to have internal competence in Service Design, while 61% have not. One fifth of the companies have used external Service Design consultants, while the remaining 4/5 have not used or could not say.

Next we asked the respondents if they perceived Service Design as favourable for their business (Figure 11).

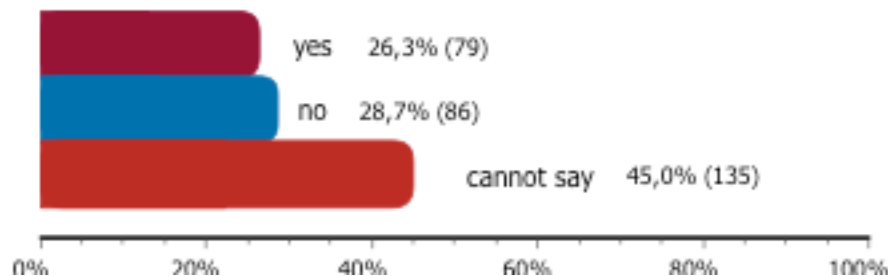


Figure 11. Distribution of responses to the question: "Do you see Service Design as beneficial for your business?"

26.3% of the respondents considered Service Design to be favourable for their business, 28.7% of the respondents considered Service Design not to be beneficial, and 45% could not say one way or the other. The latter response may be the reason of such a large percentage (60.3%, cf. Figure 8) of the respondents being unaware of the possibilities of Service Design.

Through a set of open-ended questions, we inquired what specific tools and methods the respondents had used in the different stages of developing a new service. E.g., the following tools and methods were mentioned by at least one

respondent: Market research; Customer feedback; Input and ideas from customers; Customer interviews; Test customers; Electronic feedback; Web analytics; Observing consumers and finding out what they want; Trying out what works and what doesn't; Service pilots; Mindmap; Process charts; Freeform idea creation; Formal brainstorming sessions; Idea creation workshops; A specific tool for developing ideas further.

As can be seen from these responses, different ways of obtaining input from customers seems to be a common set of methods. Different ways of testing a service before bringing it to the market were also used by some respondents. The respondents mentioned specifically only a few Service Design tools and methods (e.g., mindmap, service pilots, process charts, and test customers). Only two of the mentioned tools (i.e., Electronic feedback and Web analytics) were obvious IT-based tools (some of the other mentioned tools may be supported by IT). Interestingly, none of the respondents explicitly mentioned co-design or co-development as methods of developing services with customers. Instead, customers were seen in the responses as sources of ideas and feedback.

5 Discussion

Our exploratory study sampled employees of 300 Finnish 'low-tech' SMEs representing 70 service areas. This sample appears adequate to give at least some insight in the studied topics in Finnish 'low-tech' service companies. 272 out of the 300 respondents were CEOs. Thus, their responses represent a senior manager's perspective to the studied topics. A majority of the sampled firms, 85% to be exact, had 20-49 employees and thus were small-size companies.

The markets the firms operate in were described as competed: according to 92.6% of the respondents, the markets were at least moderately competitive (and furthermore, nearly half of the respondents described the markets as aggressively competitive). Thus, it can be interpreted that the competitiveness of the markets puts pressure on a majority of the respondent firms for renewal or increasing their competitiveness, rather than passively expecting the business to remain as usual. This interpretation is supported by the data that almost two-thirds of the firms reported to seek at least a moderate growth in their business.

The current speed of NSD varied notably between the respondent companies. 9.6% of the respondents reported that it takes for them less than a week to develop and bring a new service to the market, so these firms can be interpreted to have a rapid approach to NSD. However, for more than half (57.4%) of the respondent companies it took between six and twelve months, and for almost one fifth of the firms (19.1%) it took more than a year to develop and bring a new service to the market. Obviously, the sampled firms cannot be directly compared across service activities because what exactly constitutes 'bringing a new service to the market' may vary greatly between, for example, a restaurant compared to a vehicle maintenance service. A topic for further research is to compare the different service activities with regard to their average speed of developing and introducing a new service.

The frequency of service offering renewal also varied notably between the respondent firms. Almost one third (29%) of the surveyed businesses reported to have renewed significantly their service development activities during the past two years. Furthermore, around one third (35.3%) of the firms reported to have brought a new or significantly renewed service to the market within the past two years. However, the data indicates that the majority of the respondent firms have not recently implemented renewal or launched new services: around two thirds of the respondent firms reported not to have renewed their service development activities and have not brought any new or renewed service to the market during the past two years.

Formal service development tools seemed not to be used by the majority of the surveyed companies: almost 3/4 of the respondents stated that their firm have not used formal tools or methods in NSD. Only 13.8% of the respondents reported to have used specific tools or methods. However, nearly one third (30%) of the respondents firmly agreed with the proposed description that NSD in the firms was based on a systematic and predefined design process. Thus, the systematic design process in these 30% of the respondent firms is not based on the use of formal tools or methods, or the respondents were unable to identify and report their use of such tools.

A number of respondents considered that accelerating service development by halving the current development speed would make an impact on their business. The following examples from the responses of such impacts can be interpreted as positive effects on the business and thus be considered tentatively as examples of advantages of accelerated NSD. According to some respondents, the immediate business operations would be impacted positively (e.g., increased sales, faster cash flow, improved revenue, and increased market share). A number of positional and resource-based competitive advantages could be obtained, e.g. cost savings, saved resources that can be allocated to other activities, differentiation ('being the first on market'), improved value delivery to customers, and the competitors wouldn't have time to duplicate the new service. Furthermore, the firm would be able to renew faster, respond faster to changes, and obtain new customer contacts. Some of these impacts are similar to what Lankhorst et al. (2012) described as characteristics of agile development of digital services, including *renewal* (i.e., using change as an essential part of the enterprise strategy), *faster time-to-market* to outmanoeuvre competitors, *decreased development costs*, *increased customer satisfaction*, *more rapid value delivery* and *improved responsiveness to change*. This suggests that a fruitful topic of further research is to examine if certain agile practices of 'digital' service development could be adapted to facilitate 'traditional' service development in 'low-tech' companies.

One finding of this study is that NSD can be accelerated in the 'low-tech' SMEs when certain criteria are met. From the responses to open-ended questions, e.g. the following enabling criteria for accelerated service development were identified: there has to be adequate resources available (such as having a key person driving the acceleration effort);

there has to be sufficient support from the company organization; customers have to give support (e.g., the necessary trust and interactions have to be established with customers; or the business customers have to be able to move faster); and the service development work has to be systematic. The latter finding, that service development work needs to be systematic so service development can be accelerated, is along the lines of the finding by Froehle et al. (2000) that formalized NSD processes increased the speed of NSD and thus indirectly influenced a firm's ability to develop new services.

Conversely, it may be hypothesized that if one or some of these enabling criteria are not met, NSD cannot be accelerated. This is an important topic for further research. Some indication on this from the present study is that according to some respondents, accelerating service development is not possible when necessary resources are not available, or when the firm's workforce and processes cannot be adapted to develop services at an increased speed. Furthermore, accelerating service development was not considered possible by a number of respondents involved in the following services activities: electricity and HVAC installation services, cafeteria, catering, construction, and maintenance.

The respondents mentioned several potential disadvantages that accelerating NSD may have. One concern was that if service development is accelerated, mistakes can be made and the quality of the service may suffer, which will in turn hurt customer satisfaction. In other words, some respondents associated speeding up negatively with haste, where every aspect and opportunity relevant to developing the service may not be considered because of lack of time or progressing too fast. Furthermore, some respondents thought that accelerated development would result in the launch of incomplete or untested services. An additional potential disadvantage mentioned by some respondents was that accelerating service development would not lower development costs, but may turn out to be expensive or to require excessive resources, and thus have a negative influence on the firm's competitive advantage. A topic of further research is to identify accelerated service development projects that have failed or produced incomplete or badly received services, and find the reasons for these failures (i.e., to find out to what extent the failures were caused by an accelerated development speed).

With regard to utilization of Service Design, our findings suggest largely an unawareness of its potential among the respondents. Nearly one-third (27.7%) of the respondents reported to be aware of the possibilities offered by Service Design. This proportion is consistent with the data that 26.3% of the respondents considered Service Design to be favourable to their business. At the same time, almost two-thirds (60.3%) of the respondents reported to be unaware of the possibilities of Service Design. In a similar vein, the respondents reported to have used only a few SD tools and methods. Nearly two-thirds (61%) of the respondents reported that their firms had no internal competence in Service Design. These are indications for Service Design consultancy companies and research organizations working with Service Design to raise the awareness of Service Design, at least in Finland.

6 Conclusions

The findings of this exploratory study give some insight on how speed in New Service Development is perceived among Finnish 'low-tech' service sector SMEs. A number of indicative benefits and disadvantages of accelerating NSD were identified. The main advantages were that accelerating NSD could improve competitiveness, operations, value delivery, responsiveness, and renewal. The primary concern of speeding up NSD was that the resulting service could be of inferior quality, and thus impact customer satisfaction negatively. Additional concerns of accelerated NSD were that it would require excessive resources, turn out to be expensive, or that grave mistakes could be made during development process. Furthermore, some concern was raised whether or not the workforce and firm processes could adapt to accommodate accelerated service development speed.

A surprising finding was that nearly one tenth of the respondent firms were already engaged in fast service development, as they reported to typically develop and launch a new service in less than a week. At the same time, for more than half of the respondent companies developing a new service it took between six and twelve months, and for nearly one fifth of the companies it took more than a year. Thus, there is clearly room for accelerating service development in many Finnish SMEs. For Service Design practitioners, one indication from the study is that the potential of Service Design discipline is not yet well recognized in Finnish 'low-tech' service sector SMEs. Furthermore, it is a topic of future study how SD practitioners and researchers perceive the situation, e.g., what challenges they see in 'low-tech' service firms adopting SD practices, and how the service designers perceive the possibilities of accelerating NSD through SD tools and methods.

The findings suggest also other areas of further research of speed in NSD, including a detailed comparison between firms operating in distinct service areas, of different sizes, and in different countries. Weerawardena and McColl-Kennedy (2002) have emphasised the significance of distinctive capabilities to obtain sustained competitive advantage in NSD. With regard to NSD speed, a future research question is what kind of distinctive capabilities do firms need to be able to accelerate their service development activities, and what can the firm's strategic leaders do to develop these capabilities in the organization? For example, in what ways can traditional and IT-based Service Design tools be adapted by an organization to facilitate speeding up NSD? Furthermore, it seems fruitful to build upon the work by Lankhorst et al. (2012) and explore how agile practices of 'digital' service development can be adapted to facilitate accelerating 'traditional' service development in 'low-tech' companies.

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Consumer value journey with pet in multiple service touchpoints

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Our paper explores how consumer value is negotiated in pet-related services. We combine the discussion on value with the standpoint of service design; the approaches of consumer journey and service touchpoints. The contribution lies in discussing how consumer value is experienced in pet-related services through and by the pet, not only within dyadic interaction between consumer and service provider. We argue that applying a consumer value journey gives a comprehensive understanding of experienced value in several touchpoints with multiple service providers.

1 Introduction

In service research, the value creation has traditionally focused on service provider and its processes for customers (see Johns, 1999; Osborne; Ballantyne, 2012). The approaches have emphasized the dyadic interaction between consumer and service provider starting from the early work of Nordic school of service marketing (Grönroos, 1978; Gummesson, 1979). More recently, the idea of co-creation of value (Prahalad; Ramaswamy, 2002) in philosophical level, and activities of service design in more practical level have underlined, firstly, the importance of service provider–consumer interaction, and secondly, understanding the integratable resources of these two actors (Lusch; Vargo, 2006). In these discussions consumer interaction is seen directed by service design (Mickelsson, 2013, 536) and the examinations have focused on the consumer's engagement in the value-creation process (Vargo; Lusch, 2004).

However, consumer value emerges not only in interaction with a firm, but also together with and in relation to other actors of everyday life (Heinonen et al., 2010; Mickelsson, 2013) such as other firms, communities and co-consumers. Many of the actors and their behaviours may not be manageable by the service providers (e.g. Gabriel; Lang, 2006). Since our empirical study takes place within context of consumption for and with pets, let's consider an example that your dog is having hip dysplasia and needs treatment. You may have a dyadic 15 minutes service encounter with your veterinarian, but before, during and after the encounter you are also in contact with physiotherapist, dog agility community and the breeder of the dog. Different actors contribute to the service experience (Tax et al., 2013). Consumers may also use service in a way the service provider did not plan for. In other words, consumers face multiple touchpoints (Patrício et al., 2011) with several different service providers even at the same time and therefore consumer journey (Tax et al., 2013; Shove et al., 2012, 132) is layered, sometimes scattered. In this paper consumer journeys are not assumed to have a predetermined or designed order. Instead, we see consumer actively constructing her journey with companies, commercial actors, and also products, services, persons or other communities (Cova; Dalli, 2009).

Where service research has traditionally focused on dyadic interaction between the consumer and service provider, the previous research on consumers and their animal companions has to a great extent concentrated on pet owners' relationships to their pets. This line of research originates from Human-Animal-Bond (HAB) studies, starting in 1970's (Hines, 2003). The focus has been, for instance, on how pets are part or extensions of their owners' selves (e.g. Belk, 1988; Hirschman, 1994; Bettany; Daly, 2008; Dotson; Hyatt, 2008). Studies seem to share an interest to endeavour how pets have been considered as objects of consumers' love and attachment (e.g. Beck; Katcher, 1983; Belk, 1996; Voith, 1981). Jyrinki (2012) claims that attachment should be seen as multidimensional phenomenon that is constructed dynamically; thus, the pet owner does not have just one kind of relationship to her pet, but the pet may be regarded simultaneously for example as a friend and as an equipment for avocation.

As prior research has concentrated on examining the consumer-pet -relationship, it has ended up neglecting a large area of pet-related consumption. However, taken a more holistic view, it is obvious that experiences in pet-related consumption are not constructed in an isolated relationship between the owner and her pet, but several other actors, such as service providers, sellers and producers participate in constructing the consumer value too. As Prahalad and Ramaswamy (2002; 2004) have argued, value is co-created with consumers and other actors in networks (also Vargo; Akaka, 2009). However, few exceptions to this shortage in pet-related research exist; for instance the interaction between pet owner and vet has been studied (Brockman et al., 2008; Harrison-Walker, 2001). Yet, there are no studies on how interaction between the pet and the service provider influences pet owner's consumption experience (except, see report by Coe; Adams; Bonnet, 2007; Rötzeimer-Keuper; Wunderlich, 2014).

In the current paper, we aim to argue through our qualitative material that the experienced value in pet-related service consumption is constructed contextually in tripartite relationship between pet owner/consumer, pet and service provider (Syrjälä et al., 2014). Our viewpoint is consumer-centric, and departs from the traditional firm-centric perspective of service research (see Osborne; Ballantyne, 2012). From this viewpoint pet owner appears in a two-fold role: consuming various products and services to the pet (Brockman et al., 2008; Harrison-Walker, 2001), and creating value journey in interaction with service providers (Teixeira et al., 2012, 364). Even though we adopt consumer's point of view, the pet is also seen as an independent actor, who interacts and influences consumer's feelings, activities and the value experiences.

2 Theoretical framework

2.1 Consumer value

Among the various discussions on consumer value (see e.g. Gummerus, 2013; Sánchez-Fernández; Iniesta-Bonillo, 2007), we lean on Holbrook's (1999, 5) definition of value as 'an interactive relativistic preference experience'. This means that value is constructed between the consumer subject and an object, for example a product (Holbrook, 1999). As Holt (1995) argues, products are not just carriers of meanings, instead meanings are created when we are using, valuing, understanding and experiencing consumption objects within various social contexts. In current research, the interest is in how consumer experiences value. However, we argue that the value experience should be seen as interactively formed. Similarly, Helkkula et al. (2012) see that value in the experience is intra- and intersubjective, the experience is individual and subjective, yet created jointly, for example in the manners that pet owners share and evaluate various consumption objects in the hobby communities.

According to Holbrook (1999) relativistic value experience refers to the subjectivity of experience and to its relation to other products, services and situations. The value experience gets structured also along consumption experiences of other consumers (Helkkula et al., 2012): when they compare the experiences of products and services with each other. To illustrate, pets' grooming services are valued in regards to previous, best and other pet owners' experiences.

Preference in experienced value in turn means favouring of certain products or services, and accordingly the value reflects for example consumer's attitude toward, or attractiveness of the experienced service. Preference may be directed towards the whole service experience, part of it or the result. (Boksberger; Melsen, 2011.) It should be taken into account that experienced value includes several types of preferences, not just economic but also for example emotional (Gummerus, 2013; Karababa; Kjeldgaard, 2013). Thus, for instance when different dog training services are sequenced, the value experiences get constructed along multidimensional preferences with emotional meanings.

The experiential nature of consumption brings feelings, emotions, play, images and other consumption related aspects meaningful to consumption (Holbrook, 2006). Consumption experience is not restricted to marketplace or buying situation, but experience may take place outside markets, still in relation to market-created products and/or services (Carù; Cova, 2003, 276). Thus, consumption experience may be carried out in dog park (outside actual markets), where dog owners share their recommendations of, say, dog collars (product in the market). This is in line with the idea that consumers experience services as journeys.

2.2 Consumer value journey

Alongside with the concept of experienced value, we use concepts derived from service design approach to describe the construction of consumer value in pet-related services. By service touchpoint we refer to the ways of interaction between consumer and service across multiple channels (Bitner; Brown; Meuter, 2000; Patrício et al., 2011). People, encounters, tangible elements, spaces and objects can all be seen as touchpoints (Clatworthy, 2011). A series of digital or real life touchpoints form a consumer journey that includes all the events and activities related to service, product or problem solving from the consumer's perspective (Patrício et al., 2011). The consumer journey may therefore extend over different channels, physical place and period of time (e.g. Shove et al., 2012). It may be designed (e.g. Zomerdijk; Voss, 2010), but consumers do not necessarily follow or face the journey as intended.

We set the concepts of service touchpoint and journey into context of variety of service providers, where combination of multiple interdependent services is involved in contributing to consumer's value experience (van Riel et al., 2013, 316). We take consumer-centric perspective to analyze, how consumers construct their journeys with different firms, and also with products, services, persons, co-consumers and communities (Cova; Dalli, 2009). Tax, McCutcheon and Wilkinson (2013, 2) have pointed out that service delivery is increasingly fragmented and consumers encounter several providers when using services.

In our study, the consumer value journey depicts all the experiences with different actors (e.g. vet, pet shop, insurance company) and service touchpoints (digital, real life) in time and in space. Thus, we do not restrict our exploration to any singular service or provider. As Johns (1999, 966) suggests the idea of service as a journey is not limited only in time and space but it denotes also an adventurous service odyssey. In order to grasp the journey and the touchpoints of consumer and the pet as a co-consumer we apply the concept of value wheel. The wheel illustrates what and how consumers encounter touchpoints along the service journey (Lee et al., 2013).

3 Data and methodology

The empirical material of this study consists of 53 personal pet owner interviews. In three of the interviews two persons from the same household participated. Research participants were recruited through snowball sampling (Merriam, 1998, 63) and during fieldwork in pet supply stores, vet clinics and communal dog parks. Altogether 38 women and 15 men took part to the interviews. The age of the respondents varies from 21 to 75 and the majority of the participants (12) are aged between 30 and 39 years. Participants are either dog or cat owners and almost everyone has at least one dog. The interviews were carried out between December 2012 and January 2014 in Southern and Western Finland by four different researchers.

In recruitment, our aim was to find different kinds of pet owners, such as pet-related hobby enthusiasts that train actively e.g. agility, dog or cat shows and obedience trials as well as pet owners, who do not have any avocations or specific devotions with their pets. The participants were also recruited on the basis of dog or cat breed so that owners of different breeds would be presented. Three (3) of the interviewees are also working as professional veterinarians in private clinics and four (4) are working in a pet shop chain. Some of the interviewees are, or have been, also breeders or small kennel owners.

The interviews were guided by a semi-structured but flexible interview framework. The framework was customized to each participant depending on his or her responses (Eriksson; Kovalainen, 2008). This allowed new questions and directions to be brought up during the discussion. The interview themes covered pet owners' everyday life and pet-related (service) consumption from several angles. Interviewees were asked and encouraged to tell freely about their daily routines, possible problematic situations, service encounters and products, but also about pet-related hobbies and hobby communities. The aim was to provide in-depth understanding of pet-related consumer market (Moisander; Valtonen 2012, 249).

The research participants are seen as active subjects that actively take part to creating social meanings concerning pet-related consumption. In this sense the interviewees – as well as the interviewer – are not seen as passive objects but subjects shaping the contextual understanding of pet-related consumption (see Moisander; Valtonen, 2006). The experiences of the interviewees are understood as personal, but constructed and shaped by social interaction.

The analysis was an iterative process where data and theory driven stages altered (Thompson, 1997). In the first stage, before the actual analysis, the researchers got to know all the material gathered without specific questions in mind. At this stage we were interested in pet-related consumption in general. In the second stage, two researchers applied the Holbrook's (2006) definition of value as 'an interactive relativistic preference experience' as an analytical tool. In addition to this, consumer journey maps (Patrício et al., 2011) were used as a visualization tool to recognize and understand the actors and functions reproduced in the interviews. The analysis was deepened by discussions between all the researchers.

The article is positioned within the interpretative research paradigm (Shankar; Goulding, 2001; Moisander; Valtonen, 2012) and the interviews are interpreted as narrative stories. Whitebrook (2001, 9) has argued, that narrating is a basic human activity since persons understand their own lives as stories. We believe that consumers express something about their own way of thinking as well as the cultural norms of society through storytelling. In service design storytelling is used both as an informative and inspirational method for design (Kankainen et al., 2012), and as an approach from the company side to create stories for communicating with the consumer/customer (Vollmer, 2013).

Kankainen et al. (2012, 221) combine storytelling with customer journey by reading the consumer/customer stories, and defining the service touchpoints. The authors define that service journey is often structured on multiple service providers, networks where service providers together or without knowing each other create the consumer service experience. In this multi-channel service ecosystem, a consumer can create and influence on her own service journey. On the other hand, service provider may influence on the service experience by developing the service, prototyping it, and managing the context in which experience is happening. (Kankainen et al., 2012). Narrative stories thus enlighten how consumer arrives at a particular service journey with certain touchpoints (Vollmer, 2013, 52).

In the following chapters we analyze: 1) how consumer experience value with pet, and 2) how consumer creates value journey in a case of multiple touchpoints with multiple service providers.

4 The pet co-creating consumer value

In pet-related consumption the pet itself plays a significant role: it has been seen, for instance, as a co-consumer (Vänskä, 2014). However, the presence of this third party at the construction of consumer value varies. To analyze the multidimensional and dynamic position of the pet, we operationalize a touchpoint wheel (see e.g. Lee et al., 2013) as an analytical tool to explore consumer value. Therefore we conceptualize the wheel as a consumer value wheel. The wheel illustrates the variable position of the pet that shapes the way pet owner encounters service touchpoints and experiences value. Thus, the wheel spins. The idea of variable position of the pet is in line with the argument that the pet owner does not have just one kind of relationship to her pet but the relationship is constructed dynamically (Jyrinki, 2012).

Thus, the value wheel is usually used to make sense about customer touchpoints between a customer and a company or a brand. We contextualize the wheel to analyze the touchpoints from the perspective of value experienced by consumer during the value journey through multiple service touchpoints in regards to pet-related consumption. We follow the argument of Syrjälä et al. (2014) and situate the pet in the core of consumer value wheel as a value creator, a mediator of value (between consumer and service provider), and as an experiencer of value.

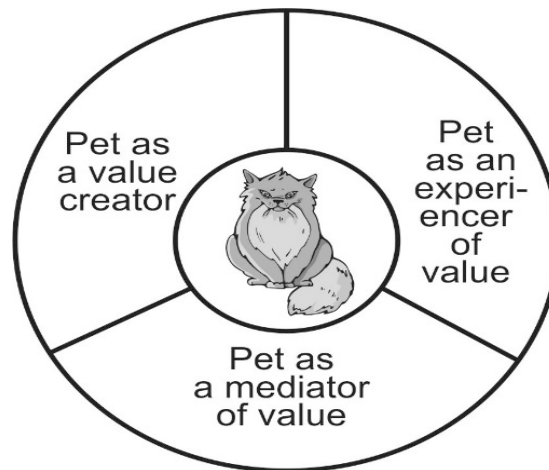


Figure 1. The consumer value wheel: Pet as a value creator, as a mediator of value, and as an experienter of value.

Next, we study the value experience in the relation between the pet owner/consumer and the pet (Figure 1). First, (i) the pet acts as a value creator, when the value experienced by the consumer is created in the interaction between the pet and the service-provider. Second, we focus on the relationship between the pet owner and the service provider, where (ii) the pet acts as a mediator of value. Third, the pet is positioned as (iii) an active subject that experiences value. The agency, meanings and the position of the pet in the family shape the value experienced by the consumer. In chapter 5, we conceptualize and contextualize the three-dimensional (Figure 1) value experience as a value journey including multiple touchpoints with several firms and other actors.

4.1 The pet as a value creator

Pet owners' descriptions of a tight-knit and close relationship to their pet speak of the consumer's value experience which is constructed in looking after the animal's wellbeing and affection toward the pet. The relationship between pet owner and pet is outlined by emotional factors linked to the pet's wellbeing: *"It makes no, you know having an animal in the first place makes no sense, unless you care about it"* [Interview 17]. When the value experience is outlined through the pet, the owner's own agency is placed in the second position and the pet's significance takes priority when the owner considers consumption decisions and use of time (Ridgway et al., 2008). An informant states: *"for wellbeing I absolutely do spend more money on the animal than on myself"* [Interview 20]. Looking after the animal's wellbeing and succeeding at it hence create value for the owner (Dotson; Hyatt, 2008). Consumers assign a separate agency for the pet, represented as independent of the owner. The pet owner constructs the position of the pet as an active subject as follows: *"(N)othing is as much fun, as watching them be so happy when they get out there to run around a bit and roughhouse with their friends"*. [Interview 22] The consumer perceives the pet as a sentient and experiencing actor. The pet as a subject of its own has resources that shape the value experienced by the owner.

The pet's active status is meaningful to the owner, as the pet is depicted as a playful actor, bringing the owner fun and joy (Holbrook, 2006). Following and interpreting the pet's actions and living with a pet create value (Beck; Katcher, 1983), making detached actors superfluous. A pet owner describes a relationship with the pet, where the owner's sense of wellbeing is essential:

It's also been kind of a lifeline, like if you're really stressed out, it's really great to see the dog having fun, rolling around in the snow or whatever. Because it can't help but it can make you feel better, because the dog is never really in a bad mood. It's pretty much in that sense, like all you have to do is go home, there's a happy dog waiting for you there, so that does make you feel good. [Interview 21]

Positioning the pet as a subject that shows affection towards its owner would appear to be pivotal to the value experience: *"Well if I think of my own pet, it loves me exactly as I am, completely like unconditionally, and loyally."* [Interview 3]. The consumer's experience of the relationship between pet and owner forms as reciprocal: both in turn are active subjects, and objects. The pet as a subject is built upon interpreting behaviour and being, and humanizing the pet (Beck; Katcher, 1983), but also of its natural aspect and qualities as an animal.

4.2 The pet as a mediator of value

Above, we have examined how the relationship between consumer and pet enables the formation of a value experience. Now, we examine the relationship between service provider and pet owner, where the pet plays a pivotal role in value creation. Here, the consumer's value experience results from her interpretation of the pet's experience from the interaction with service provider.

The consumer gives and receives recommendations, and eventually decides which products and services are acquired to the pet. Thus, the pet owner defines the value experience – in relation to the service provider and through the pet. In the following quote, the consumer explains how pet's food-related choices are formed in interaction with both social media and a service provider:

He ate, when he was a puppy it was something like Royal Canin food and I, you know, when I had time I went and read all the online chat forums for what's in them and what's good and what's bad and then I came up, talking at the pet shop about what's good. So then they said that that's got the worst nutritional values like it doesn't even say what the meat content is and, then after that, I made or you know they recommended some different options where the meat content at least is really good and then the kibble, I used those but so other than that it's raw food [i.e. BARF Biologically Appropriate Raw Food] so that it's.. [Interview 32]

The service provider gives the pet owner diet recommendations, which the owner approves of, because she has 'the best interest' of the pet at heart. A pet shop does not simply sell products; it creates value for the customer through expertise – instructions, advices and recommendations.

In the relationship between service provider and the pet owner, value creation is negotiated via the pet, however involving also social networks and communities of the owner. Consumption objects and actions are employed as vehicles to join enthusiasts of a given hobby or a certain dog breed, to those that favour a specific retail outlet or a specific breeder. For instance, communities formed around enthusiasts of a specific breed or around a breeder are comparable to brand communities (e.g. Muniz; O'Guinn, 2001). The qualities of a pet – a given breed – or status within the family are significant when a consumer justifies the profitability of insurance:

For a puppy I'd say it's pretty important, or if for some really hard-core racing dog, then it's probably really important. But maybe for just your normal house pet, then it's not necessarily quite as important. [Interview 21]

Thus, it is not just affection towards the pet, but also the financial risk is taken into account when deciding whether to insure the pet. Getting and keeping a pet involves the threat of financial loss. Awareness of available insurance policies may also reinforce awareness of the risks, for example the conditions of puppy insurance may pinpoint the health-related insecurities such as possibility for hip dysplasia. In this manner, the insurance appears as a way externalise the risk related to acquiring a puppy. Similarly, comparing insurance quotes, acquainting oneself with indemnification regulations or picking a veterinary surgeon may be challenging decisions for a pet owner. So, in this case, the value is constructed in relationship between consumer and service provider, and the pet is positioned as a negotiating instrument.

When a consumer justifies choices such as a recommendations concerning pet food, selecting an insurance company, or purchasing dog collars from a flea market, a pet constructs as a mediator of value. The agency, which a pet owner has posited to her-/himself (e.g. as an active enthusiast) and the status that the pet owner has produced for the service provider (e.g. a speciality retailer) define the value, alongside the status given to the pet (e.g. family dog).

4.3 The pet as an experienter of value

In this chapter, we show how pet owner's consumption experience in relation to the producer of pet services is created indirectly through the pet's experience. When the consumer takes the pet's experience under evaluation, pet's 'dual role' is outlined, both as a consuming subject as well as an object transmitting the experience to the consumer. For instance, pet's emotions and proper treatment are of primary importance when the consumer uses veterinary services. The pet takes central role in experiencing value; so, the consumer experiences the relationship with a veterinary surgeon through the pet as the following excerpt highlights:

Everything's gone well and I've felt good about it and it's left a very positive experience for the dog, too. Not that it would matter a whole lot, but so with us it's actually a joke because it's in Munkkivuori really near us, so Hertta always goes on a walk, she walks there [laughs], to the door of the veterinary clinic because the ladies always come and give her treats out the door. [Interview 5]

The quote sums up the three-dimensional nature of relationships in pet service consumption: in addition to the relationship between consumer and service provider, understanding the consumption experience and the value experienced by the consumer requires taking into account the interpretations and evaluations made through the pet. The experience is not analyzed as separate from the pet; instead the pet is positioned 'between' the consumer and the service provider. The interview reveals how the pet is positioned as an active subject that experiences the service. It is the consumer's interpretation of the pet's experience that structures the perception of the relationship with the service provider. This functions as a resource for experiencing value in the relationship between pet owner and service provider. The consumer describes the value experienced in a service encounter through the pet: "*We go to canine massage. (...) the pleasure you feel yourself, when it looks like the dog's enjoying it, makes it worth it.*" [Interview 20]

Pet-related consumption experiences are also analyzed according to which product or service the consumer perceives as worthy of her pet. Owners highlight that not all objects of consumptions are "*good enough for my pet*".

This is related to a view, prominent in prior research, of the pet relation as an extension of the owner's self (Belk, 1988, 1996; Hirschman, 1994). The value experience occurring through the relationship between the service provider and the pet may be difficult to recognize, as the significances linked to the pet merge into the owner's self and on the other hand the owner constructs experiences of value for the pet. When the service succeeds, the social relationships between people and factors focused on the animal become hard to distinguish. An informant describes veterinary services: "We were treated well there, the dog very well". In the same spirit, value experiences regarding veterinary services are comparable to experiences of public and private health care services for people:

Hell no, not public. I use private. Because in the private sector, the differences are very similar to human health care, but in animal health care (...) the differences become more marked, so that I think in the public sector they are in a way more indifferent. [Interview 7]

The consumer describes the negative experience and the unpleasant service as indifferent. This goes against the pet owner's assumption that the relationship between pet and service provider should reflect altruistic concern for the pet (Coe; Adams; Bonnett, 2007). The technical quality and the efficiency of procedures are secondary evaluation criteria if the service is not interpreted as primarily considerate towards the pet specifically. The pet is entitled to caring service just as a human being would be. Thus, the service that is considered unpleasant in relationships between people is also considered the same in pet services.

5 Consumer value journey with pet

Above, we examined the value experienced in pet-related services through the changing position of a pet in relation to pet owner/consumer and service provider. All the positions define pet as a kind of co-consumer (see Vänskä, 2014) next to or sometimes even equal to the pet owner/consumer. Pet may create value to the pet owner as such e.g. bringing joy and fun, pet may negotiate or mediate value experience to the owner e.g. status in a breed community or dietary decision-making, or pet has its own, active value experience e.g. pet feels good, enjoys playing.

As a consumer, the pet owner generally seeks the most appropriate available solution for the pet, and wants to be a 'good parent' for the pet. 'Parenthood' can be reached through choosing a service journey that result in desired aim, e.g. a recovered dog. As a co-consumer, the value position of the pet differs depending on individual touchpoints during the journey or even depending on the whole service journey. According to Rawson et al. (2013, 4) consumers, however, do not care about singular touchpoints but they value more the experience across multiple touchpoints and multiple channels over time. Sometimes the pet is in the frontline of value experience (recovered, happy dog), creating value for the pet owner (joy about a recovery of the dog) or standing aside but having a mediating role in value experience (the value from choosing a good expert). Consumers also structure their service journey culturally and in network with other consumers.

Pet ownership, activities with and consumption for the pet have different contents in relation to various touchpoints of different providers, e.g. together with organizations, communities and networks (Figure 2). The pet owner's relationship with a service, such as a community of enthusiasts, brings out the social aspects of experience and its multifaceted unfolding. The understanding 'of the right kind and essential' pet-related consumption is constructed socially within one's own reference group or through expert advice from breeders or vets, for example. The shared traditions of the community, the sense of belonging, the value structure and a moral obligation towards group members become apparent when observing the instrumental role of the pet in the value experience (Muniz; O'Guinn, 2001).

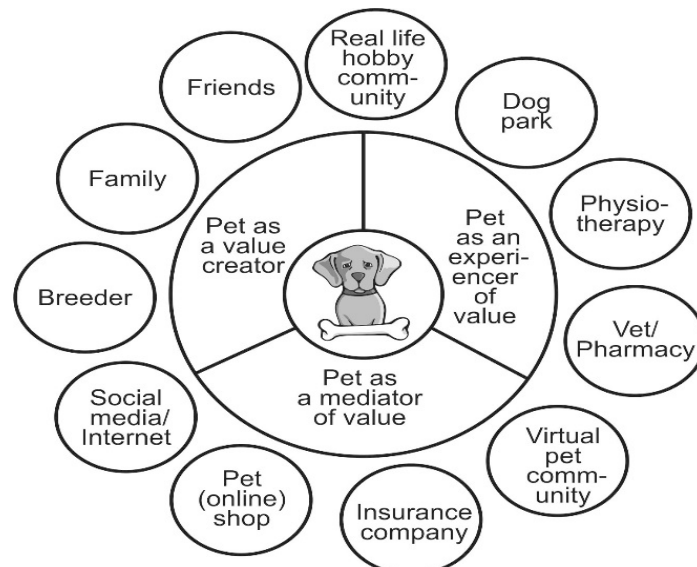


Figure 2. Consumer value wheel through pet and service touchpoints.

As the spinning value wheel (figure 2) reveals, touchpoints in pet-related consumption show fragmentation of active actors in the service delivery (see Tax et al., 2013, 454–455), and we may reckon opposing interests between the actors. Certain actors are not, however, locked to certain position of the pet when experienced, but actors in the figure and their places present an illustration of possible relations. If we consider a case of a dog with a leg injury the obvious starting point of consumer journey would be to meet the vet, probably the one that has been sending you advertisement regularly. However, the interest of a pet owner/consumer is to make the journey from sickness to health suitable for her needs, wealth, use of time, and taking the dog's 'wishes' and previous experiences into consideration. The journey may, thus, start by contacting the breeder, a friend from pet-related hobby club or pet shop, googling or asking the Facebook community about the best expert in dog leg injuries (see Patrício et al., 2011). Owner may also contact an insurance company, a pharmacy, a physiotherapist etc. before even meeting the vet.

Thus, the consumer value journey consists of events, actors, and activities which occur in different channels, physical places and time (e.g. Shove et al., 2012). Tax et al. (2013) discuss that some companies actively leave it to consumers to create their own combined service offering, their own journey. Below, we can read a story, how an owner of a Rottweiler creates his and his dog's journey concerning well-being, health, and medication:

Pet owner: We do look at them **websites, discussion forums**, although there's no such forum left where some idiot's are not trying to stir things up, but when you always leave those out you do have proper ones, plus one great thing is of course the fact that we have a good **breeder**, where we got ours from, a wonderful person, and we're good friends with her, so we can always get good advice from there, and of course we know **a lot of Rott people**, we're in the local **Rottweiler club** so, there's a whole bunch, and you know with **social media**, you do it so fast, you don't even have to **call**, so you can just type up a message and...

Researcher: And someone responds there then.

Pet owner: Someone responds, there are common sites, or then you can go there, like **Facebook** has totally, like incredibly useful, Facebook's great with all this.

Researcher: What would be your primary source of information, what would you use if you needed some information on a health-related issue?

Pet owner: If I ... you know I am such a web person, I could **check it out on the web** but, not for that long I wouldn't... I'll call, and I'd call the breeder, who's had Rotts for 30 years, and then I have... [Interview 2]

In the citation multiple persons, communities and actors come to play together and have intertwined effect to the value experience, even though they may not be designed to do so. In this manner, the citation gives voice to the fragmented nature of consumer experience concerning pet's wellbeing. However, it also shows how a narrative can act as an organizer for the fragments (Deighton, 1992). Similar to a narrative the concept of service journey gives order and structure to incidents (touchpoints) that may otherwise seem even chaotic (Kankainen et al., 2012). The journey is not predetermined, but rules of thumb and previous experiences do exist. They help, when consumer e.g. has to evaluate, what is relevant and irrelevant information and from where to get it.

During the journey different actors and influencers interact with each other, when consumer links them together and to other everyday life activities of pet owner. Consumer has a decisive role in creating or sometimes also co-creating the service provider network (see Tax et al., 2013, 456). However, consumer has also a possibility to discard the expected or supposed journey: in the story above, the Rottweiler owner might be indifferent to the existing health information by e.g. trusting the breed's general healthiness. Some consumers may also choose a journey planned by some service provider on the way of the journey, such as breeder who has tight recommendations concerning the food, or an insurance company that oblige its customers to use particular veterinarian. Narratives understood as told service journeys thus enlighten how consumer arrives at particular solution or stage (Vollmer, 2013, 52).

To illustrate the layered nature of consumer service journey with pet as a co-consumer, we draw Figure 3 on the basis of the Interview 3 that unfolds the value journey with pet in multiple service touchpoints. The journey depicts a case of a sick pet that requires actions from the pet owner. To the figure we have summarized the touchpoints with actors having influence on the progression of consumer journey and contributing to the overall value experience. The black line connects these actors in the figure. In addition, we have listed actors that are mentioned but somehow rejected or ignored – they however shape the significance of the actors included in the journey. This confirms our argument that service encounters or touchpoints do not take place in isolation but always in relation to other actors and actions of everyday life (see Mickelsson, 2013).

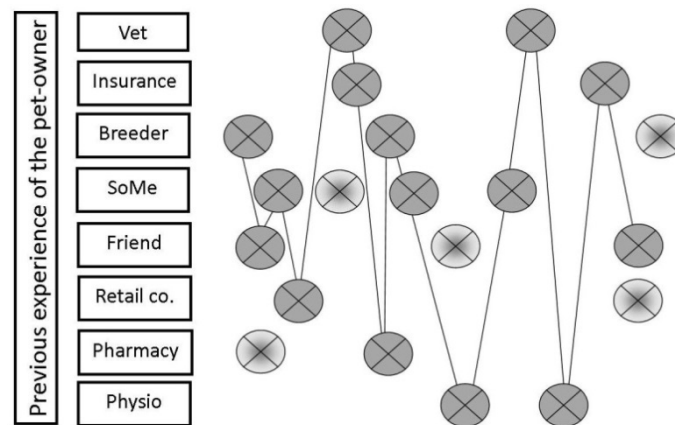


Figure 3. Consumer value journey: recovery of a sick pet.

The consumer value journey with pet is contextual and has a history. The journey does not begin from a blank slate: “When Daisy was small, she did not have anything special; however it did suffer from ear infections few times”. [Interview 3] The pet has been sick before, and the journey takes shape in relation to previous experiences. By choosing or accepting certain touchpoints with providers, the pet owner and pet as a co-consumer construct or repeat a journey that serves best at the aim to heal the pet. The value-creating journey can be defined as a set of interlinked actions that are having a shared purpose or unifying factor, and which consumers apply to create value to themselves or to co-consumers. For instance, the figure 3 shows how opinion seeking is linked to choosing the best veterinarian, using the medicine, and selecting the specialized physiotherapist, asking advices from the breeder, friends, close salesperson at pet shop, and browsing the social media. The actors may be separate, but they are not experienced separately.

In our case of a sick pet, the pet owner/consumer tries to be as good and responsible ‘parent’ as possible to her pet. Constructing or repeating journey that creates value then equates with executing proper ‘pet parenthood’. Like Johns (1999, 966) points out, from consumer perspective the concept of journey denotes more than just a passage through space or time. The journey may, for instance have a nature of an adventure that allows consumer a position of an explorer that hunts for bargains (see Gabriel; Lang, 2006). Applying a value journey as a temporal sequence hereby gives more comprehensive understanding of experienced value in several virtual and real life touchpoints, and with multiple service providers.

6 Conclusions

We have explored consumers’ experienced value in, firstly, through and by the pet, and, secondly, as a value journey in time and space. Article participates to the discussion on experienced consumer value in Holbrook’s (1999; 2006) theoretical framework. Our findings show how pet owner/consumer experiences value through the pet along consumer journey in series of multiple service touchpoints with different service providers. We argue that understanding consumer value requires expanding the traditional focus of service research on service provider and dyadic interaction between consumer and firm. According to our study, also other actors and activities of everyday life play a significant role in how value emerges and consumers experience it. In particular, in the current context, pet becomes a pivotal actor, taking variable positions along the consumer value journey.

In other words, consumer value journeys are complex and often unplanned including touchpoints with several providers, services, communities and people even at the same time. This reflects that consumers are actively constructing their journeys by using, sometimes misusing, choosing and refusing services. Service design can shape the journeys, but activities and relations beyond the scope of service provider can have a major impact. From provider-centric perspective there may be a certain ‘moment of truth’ of experiencing the service in service encounter (e.g. Lewis; Mitchell, 1990), but from consumer perspective ‘the moment’ extends over a prominent period of time and with variety of actors like other providers (Johns, 1999, 966–967).

Further, our findings support that the concept of service touchpoint referring to dyadic interaction between consumer and service provider (Patrício et al., 2011) should be reconsidered. According to our findings, touchpoints in the context of pet-related consumption represent rather a tripartite relationship between pet owner/consumer, pet and service provider. The pet has a role as an active co-consumer (also Vänskä, 2014): it participates in the negotiations and experiences on consumer value. In our study, three active positions of the pet are recognized: pet as a value creator, pet as a mediator of value and pet as an experiencer of value. The pet is a co-creator of consumer value, though it may not be included in the service design or concept. The tripartite relationship in service touchpoints show that service interaction and value experience is as much about the actors (including other people and animal companions) who are not taking part to the immediate interaction as those that are.

Even though our findings are context-specific (Moisander; Valtonen, 2012) they give a reason to consider also other contexts than pet-related consumption to hold tripartite relations. For instance, tripartite relationship has analogies to

consumption for elderly or children, as they can also be seen as vulnerable co-consumers (Rötzmeier-Keuper; Wunderlich, 2014). Similarities can also be found from car-related consumption: also cars need to be fed, cleaned and taken care of, but they can also be loved (Huefner; Hunt, 1994). Cars are sometimes described as ‘reliable, and a good partner’. Our study and these few samples from different contexts point out that consumer-centric ways of exploring consumer value are needed as they may considerably differ from procedural approaches like ‘blueprint’ or ‘service script’. In everyday life, consumers do not meet a consistent chain of service stages along the time axis in isolation but the journey appears as a layered, sometimes scattered set of touchpoints experienced inseparably.

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New Replicating Organizations on the Rise? The Case of Local Manual Services on the B2B market

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The paper aims to shed a light on significant Nordic-born corporations in today's service society, namely large organizations providing B2B local manual services (B2B LMS). These firms have grown to significant sizes, partly by acquisitions. Their services need to be performed on-site by people, and are dependent on individual skills gained through experience as well as structural capital. B2B LMS seems underrepresented in the current management literature however. The success of these corporations might be explained in part by their use of managerial principles similar to those in replicating organizations, as they share general characteristics. Related theory and on replicating organizations is reviewed and juxtaposed. In conclusion, multiple case studies on the management of B2B LMS are recommended.

1 Introduction

In 2010, almost 85 percent of the working population in Sweden was employed at some kind of service producing organization, including retailing and public services. This is just one indication of the multifaceted post-industrial society where "services" is a wide concept. It includes activities with very different business logics. Some services can be produced online over the internet, while others must still be produced manually and locally. Some services are concentrated to fewer and larger workplaces but an increasing number of people in the industrial world are in fact working at small, local workplaces. Some services require highly educated or skilled staff while others may serve as temporary jobs, when staff can be swiftly trained and put to work, regardless of prior knowledge and experience.

As services are conceptually multifaceted, it ultimately results in different conditions regarding business development and successful management principles, based on different business logics. It becomes obvious that management principles and success factors will differ from one business logic to another. Such as those of a network operator, a consulting firm, a retail store or a call center. Thus, it is hardly possible to speak in general terms of what characterizes successful business development or successful management principles in all types of services, a problem that has been discussed before (Lovell, 1983; Silvestro, Fitzgerald, & Johnston, 1992).

A considerable proportion of the growing service sector is aimed at consumers. Health care, child care and elderly care are among the expansive sectors in our part of the world. But B2B-services are growing even faster. One of the reasons is that companies and organizations are increasingly choosing to outsource professional services instead of supplying them internally. One big and expanding sub-sector is knowledge-intensive services, or consulting. Another one is the contracting of manual services, such as maintenance and repair work as well as janitorial and security services.

The focus of this paper, inspired by the contents of the reports by Giertz (2011; 2012), is to start understanding the organization and management of *local manual services* in the B2B-sector. In our definition, local manual service provision entail services that are provided by workers performing manual services locally at a client's location, e.g. carpenters, plumbers, glaziers, installers, repairmen, janitors and security guards (Giertz, 2000). Some distinguishing characteristics identified by Giertz (2000, 88) are:

- The nature of the work is local in the sense that it must be performed at the designated location. Workers cannot be separated from the workplace.
- The efficiency of the operation is directly related to the individual provider's work methods, vocational know-how and manual skills.
- The work is extremely labor-intensive. It is expanding and becoming increasingly professionalized as a result of outsourcing, exposure of in-house services to competition and the creation of customer-supplier relationship.
- Maintaining a high and even workload for the employees is necessary in order to provide cost-efficient services, as work hours cannot be stored.
- Standardization of best practice (tools and work methods) combined with learning and upgrading of skills, can yield major quality and cost advantages.
- Important competitive parameters are price, delivery time and delivery reliability, labor productivity, thoroughness and customer service level.
- The local operation can be part of a replicating organization that offers uniform service at many different locations.

If one were to contrast with two other modern industries such as Information and Communication Technology (ICT) or consulting, there are some similarities and significant differences. Most importantly, ICT and consulting services are

often, but not always, absorbed and stored into deliverable systems and can thus be performed without great dependency on location and time of services rendered, which has consequences in regards to what the business looks like geographically and operationally. As Hansen, Nohria & Tierney (1999) discussed, consultancies have seen the different advantages of focusing on codifying knowledge or focusing on retaining high performing individuals or codifying knowledge for wider use.

Similar to some consultancies, several of the local manual service professions, employers seek labor with great professional knowledge and good manual skills. In others it is possible to train new staff in a short time, making subsectors ripe with temporary jobs that attract students and others looking for extra work. Akin to what Hansen et al (1999) note as codification and personalization strategies, there are differences in how knowledge can be managed. The B2B local manual services sector is growing and we believe that it is probably becoming increasingly "industrialized", organized and rationalized. But it does not seem to have been studied at great length by researchers. In Sweden, the amount of people employed within local manual services has increased significantly over the last 15 years – from 300 000 in 1993 to roughly 480 000 in 2010. In other words, about 11 percent of all working people in Sweden are employed by companies focusing on the production of local manual services. In this aspect, the standardization of best practice and more efficient ways of managing the knowledge and people within this service sector, could have significant impacts on our economy considering the sheer number of people. As mentioned earlier, one reason behind the growing development is that many companies and organizations have outsourced certain support services instead of running them in-house (Fixler & Siegel, 1999). Specialized service industries providing local manual services, have expanded through outsourcing since the middle of the 1980's. The landscape is still changing, as it is in a considerable consolidation- and internationalization phase. Initially, the structural changes were largely about splitting up large organizations and establishing several new local or domestic service companies. Today some of the service providers, many with origins in the Nordic countries, are expanding through acquisitions of existing independent spun-off competitors. Some of them have grown into multinational enterprises competing on a global market.

An example of a service provider that has a strategy of systematically expanding on local markets in the wake of the increased outsourcing is ISS, a company within facility management and janitorial services. They have grown both organically and by acquisitions, and in 2013 the group had a turnover of over SEK 90 billion and over 530 000 employees in more than 50 countries, being one of the largest private employers in the world¹. The Swedish subsidiary of ISS had 42 000 employees, of which 12 000 were located in Sweden. Another Swedish company, having expanded internationally by acquisitions, is Securitas AB. In 2010 the group had over 280 000 employees in 45 countries, with a turnover of SEK 61 billion. There are many more examples of local manual service providers, with infra-services as an example, where many tele-operators and energy companies outsource installation and repairs. Eltel Networks is specialized in building and maintaining electrical- and telecom installations in the Nordic countries, with approximately 8 000 employees of which 2 500 were active in Sweden. Dalkia, specializing in energy and facility management has 1 200 employees at 70 branch offices in Sweden and are part of Veolia Environment, a leading global provider of environmental services on local markets, with over 320 000 employees in about 70 countries. An additional example is Finnish Caverion (formerly YIT). Caverion offers energy efficiency services for facilities. Caverion has expanded in Sweden through acquisitions of ABB Building Systems, among others. In 2010 the group employed 25 000 and 4 400 employees were active at 100 branch offices in Sweden. Companies offering local manual services on the B2B-market are a fast growing part of the post-industrial service society, becoming increasingly important employers in modern societies.

2 Purpose

An important question is how these large growing multinational companies are organized and how they manage work and motivate people – both local managers and workers. We tentatively believe to a large extent that they are managed like replicating organizations - setting up more or less identical operations on many different locations. But before studying these organizations, we will examine in what theoretical context these organizations exist. The aim of this article is to review literature and theory linked to service management and management of replicating organizations. What relevance does existing research have on understanding management in companies offering local manual services on the B2B-market? To address the issues at hand, we have formulated the following research questions:

RQ1: In regards to service concepts and management how well does the literature represent B2B local manual services?

RQ2: What does the theory and rationale of replicating organizations look like, and how well do they correspond to local manual service providers on the B2B market?

3 Method

Viewing the literature as a network of nodes with various related developments presented in each publication, we adopted an approach similar to that of Ryan, Scapens & Theobald (2002) in searching and organizing the literary sources. This paper is concerned with finding the fit of local manual service providers in the literature, and juxtaposing

¹ ISS Global A/S Annual Report 2013

them to other replicating organizations. We have made literature search based on search terms related to services, service management and management of firms with a multitude of local units. Furthermore, literature surrounding management issues, history and organization, around chain organizations in for example retailing were delved into. Searches were conducted in the search engines of Google Scholar and that of the Web of Science, using various key words that relate to our issue.

Keywords that were used included:

chain, company, company-owned, federat, franchis*, local, management, manual, multi-unit, network, organization, retail*, replicat*, service*, system, versus, wholly-owned.*²

The above keywords were combined in different fashions using Boolean operators in order to get several and more narrow sets of results. Keywords (such as *replicat**) were also added as the research progressed. Some of the authors provided further understanding with their research and terminology in their articles, which we in turn built our theoretical framework upon.

In a staged review, the abstracts of the articles resulting from the search were scanned and several interesting articles were selected. A full list was then created in a spreadsheet with all the data presented and comparable in and ordered in categories as recommended by Collis & Hussey (2009). The articles that were deemed to have a good combination or in the least a fair balance between impact factor and relevance, were read through to explore and answer research questions at hand. Books were generally judged by author impact, and were chosen only when they were an original source of knowledge and theory. Checking cited articles as well as citing articles created further literary pathways. Industry data from public sources have been used when appropriate to do so in order to illustrate certain points in the article. The companies chosen as examples in this review fit well as they fulfill the criteria of a replicating service organization with several local units governed by a central body. The central factors underlying replication theory is that an organization that has some processes and/or products that can be standardized and applied in many different locations will aim to do so, generating several advantages. The so called multi-unit companies within pure manufacturing, with differing divisions and functional units are consequently not of interest in this paper.

4 Services – Definition and Management Principles

As we have initially touched upon, services today are indeed multifaceted. As a result, the explicit definition of a service is not as straightforward as one may think. Zeithaml, Parasuraman & Berry (1985) condensed several streams of service research that had taken place until the mid-1980's and listed four dimensions (IHIP) of what defines a service; (1) *intangibility* which refers to the notion of services as performances rather than products; (2) *heterogeneity* relating to the variability in performances; (3) *inseparability* due to production and consumption being simultaneous; and (4) *perishability* as services cannot be saved or stored. Services according to Bitner, Brown and Meuter (2000) have claimed that services have previously been exclusively in a "low-tech, high touch paradigm" (p. 146-147), which to some extent changed with the advent of information technology (IT), challenging the IHIP concept considerably. Experts interviewed by Edvardsson, Gustafsson, & Roos (2005) critique IHIP, with some of them mentioning technology as a reason. B2B local manual services themselves do not quite apply in this context. Information Technology does not enable the work to be "electronically" performed remotely, stored, or completely standardized. Although, as much as technology is changing the playing field in many ways, especially in regards to many modern high-tech services, they are not a significant topic in regards to B2B local manual services.

Edvardsson, Gustafsson & Roos (2005) as well as Vargo & Lusch (2004) also argue that the aforementioned characteristics of intangibility, heterogeneity, inseparability and perishability are obsolete in the sense that they are too producer- and goods-oriented and that the customer is the center of interpretation. We do acknowledge that the recent customer perspective is a valid interpretation in its own way, and that IHIP the correct paradigm of all services today. Yet, to objectively describe these services from the eyes of any third party observer, IHIP cannot be fully dismissed. Some of the "old-fashioned" manual services that are still required today, and that will not be automated in the nearest future such as cleaning, maintenance and repairs, stand as examples in this matter. A clean workspace or a set of connected circuitry, and the processes behind these results cannot be defined as a tangible *object*, and they are heterogeneous and perishable for both customer and provider.

The possible exception nevertheless, would be inseparability which can be questioned in a B2B-setting, where the business customer rarely needs be present to consume during production. In the Nordic School of Service, alongside the service marketing profiles of Evert Gummesson and Christian Grönroos, Richard Normann is a notable profile with a consulting background in corporate strategy and organization theory (Gummesson & Grönroos, 2012). In his work *Service Management: Strategy and Leadership in Service Business*, he set the foundation of many longstanding service-related concepts. The perhaps most recognized one however, is an important foundation of his and Grönroos' (2007) perspective on service management, namely, *the moment of truth*. According to Normann (2001, 21) it can be defined as the moment when "... the service provider and the service customer confront one another in the arena", and when "... the skill, the motivation and the tools [of] the firm's representative [meets] the expectations and behavior of the

² Stars [*] indicate a truncated word. All words pluralized when possible.

client which together will create the service delivery process". What constitutes the moment of truth between service employee and customer varies between different types of customers, and among different types of services. Within local manual service production on the B2B-market, it is more difficult to identify where the moment of truth occurs. Between whom lies the primary interaction? The purchasing manager of the client firm, his colleagues that work in the vicinity of the local manual service employees, or the colleagues that primarily benefit from the service? The workers in service companies may run into employees in some of the client companies, but they very often perform their duties without interacting with the client company employees, at least not systematically with a value creating purpose. On the B2C service markets, there is often more or less a direct contact, as service providers often simultaneously interact with the buyer and primary beneficiary of the service, as they are commonly the same individual. In a B2B setting however, where many of the larger providers of local manual service can be found, the picture is somewhat different, which is a first of many reasons of why these organizations are interesting objects of research. Having touched upon the matters of services themselves we will in the following section discuss the organizational aspects and structures that enable the provision of services.

5 Replication

Large and growing B2B local manual service providers share organizational characteristics analogous to *replicating organizations*, with several local independent units arranged around a central governing node. Therefore, we will in the following sections study the theoretical aspects of these. The theory on replication of routines has been discussed for some time, with *replicating organizations* and *replication as strategy* being coined by Winter & Szulanski (2001). Today the terms often pertain retailing and chain restaurants when discussed in the literature.

5.1 Replication as strategy

Replication of organizational routines implies that routines "... *play the role that genes play in organizational theory*" (Nelson & Winter, 1982, 14), which Bengtsson (2008) interprets as building blocks that characterize a firm and what it can do, and thereby determines possible behavior. Replicating routines would thus be to follow the logic of any life form that wishes to procreate, carrying on the genes to new "organisms." Nelson and Winter (1982, 118) on the other hand also describe replication as a "*costly, time consuming process of copying an existing pattern of productive activity*". In fact they question whether replication of routines is a fruitful exercise citing Polanyi's (1962) observation of a light bulb blowing machine identical to another that failed to produce light bulbs at a different location for a whole year.

Winter and Szulanski (2001, 730) define replication as strategy as "... *the creation of a large number of similar outlets that deliver a product or perform a service*", or as they define it in layman's terms, "*the McDonald's approach*." The underlying goal is to attain economies of scale and leverage brand recognition. In this setting, not just one routine is replicated but a multitude – as many as it takes to independently run a local operation. Organizations may benefit from applying their routines in more than one setting, stretching their life cycle as Helfat & Petaraf (2003) argue. As a replicating organization expands to further locations, its centre or node develops its replication capabilities, or its dynamic capabilities. Winter and Szulanski (2001, 733) refer to these as the *arrow core* – the essence of "*what, how and where*" the replicator should try to replicate its business model.

Winter & Szulanski (2001) indicate that during expansion, or creation of a local unit, there is a broad scope of knowledge transfer from the centre, or great modification of a target outlet, i.e. creating a local unit that can sustain itself via local production of products and/or services. In other words, a new McDonald's outlet has enough routines transferred to it that it may produce meals and create value for customers independently and geographically separated from other McDonald outlets. Again, this is very similar to local manual services providers where local units are able to perform services independently under local leadership. A so called faux-replication strategy, according to Winter and Szulanski (2001), would apply to retailing, or simply where producing products are of primary concern, or where on-site idiosyncratic services is non-existent or subordinate to the simple distribution of goods.

In the light of replication and services, Richard Normann points out a less recognized element in service management. He points out that scale advantages does not only belong to the domain of manufacturing industry of tangibles, but it is evident that "bigness" can be a benefit to service firms as well. Such advantages may come in the form of brand, culture, network effects of systems and scale effects of purchasing and knowledge management (Normann, 2001). Normann further discusses the reproduction of a service management system, as means of growth for a firm by multiplying through a reproduction formula (similar to the Arrow Core discussed by Winter & Szulanski (2001)), in effect transferring a service management system and its social innovations from one place to another. According to Normann (2001,174) replicating a service management system requires: (1) an analysis in order to find "the single logic" that contains the necessary functional characteristics; (2) a conceptualization of these so that they may be fully formulated and controlled; and (3) establishing central management, policies, as well as information and support functions. One could argue that this is at least partly related to the Arrow Core and its principles. A challenge Normann (2001) brings up regarding the replication of a service system, which is similar to what Winter and Szulanski (2001) argue, is the process of discerning what is replicable or not. An idiosyncratic local phenomenon may not necessarily transferrable to another location. Interestingly there are some similarities between the two theory bases, yet

no formal theoretical connection exists between them in the literature. Treading into the realm of replication, we will in the next section focus on the theoretical concept of replication and replication as strategy.

5.2 Origins and Notable Examples

Replicating organizations have become a dominant type of organization in our time, but their history dates back at least 200 years according to Lebharr (1952). It is possible they have done so even longer than that, nonetheless it stands in contrast to Nelson and Winter's (1982) perspective on replication. One of the origins of replicating organizations can be found in the retailing sector (albeit faux-replicating organizations.) Ambitions of increased volumes and economies of scale manifested themselves through attempts to closer link suppliers with many local outlets through which to distribute the products to the end consumers. In the post-Civil War United States, as retailers were growing exponentially larger in the urban environments and mail-order companies were also gaining considerable market shares, the *chain stores* emerged in smaller cities and suburbs (Chandler, 1977). They began forming in trades where retailers were not already strongly established, such as within groceries, drugs and furniture, as single store merchants wanted to increase their sales volume, escaping their single-store limitations through franchising (Lebharr, 1952). As such, the growth was initially regional rather than national. By the 1920's the chain stores were the fastest growing type of mass marketer and eventually became the standard instrument for mass retailing in the United States (Chandler, 1977). The wholesaler-retailer system was initially very well entrenched to the point that manufacturers refused to sell directly to the chain stores (Lebharr, 1952). Control over an efficient supply chain is naturally important (Vida, Reardon, & Fairhurst, 2000), but equally important is the ability to distribute the goods to as many customers as possible, which requires a presence (Lebharr, 1952) at and mastery (Greenwald & Kahn, 2005) of several local markets. The chain-stores had stores in many locations, fulfilling the distributive criteria, and thus worked towards securing a better and more direct connection at the supplier/manufacturer side. This led to two distinct channels of distribution during the growth of American chain-stores: the wholesaler-retailer system and the chain-store system.

Today as well, many of the largest replicating organizations (by its core definition) can be found among retailers. Among them, Walmart – even though it is not the first in its cadre - is a well-known chain-store system and an operationally successful example among American (and international) retailers. It is the largest retailer and private employer of the world with over 2,200,000 employees worldwide and wholly owns their entire chain of stores. In the same vein as that of the post-Civil War chain-stores, Sam Walton established his network of Walmart stores in what he called “one-horse-towns”, and has heavily invested in information technology and efficient logistics. The information technology investments began in 1969 with a computer at their first distribution center, and by the late 1970's there was a computer at each distribution center and store, forming a network. With it, Walmart eventually took the notion of getting closer to the suppliers to a completely different level in 1990, by connecting their suppliers to their network through the software Retail Link. Walmart was also an early adopter of barcodes. Technology created a basis for growth and growth in turn brought further advantages through amplified economies of scale as well as scope (Basker, 2007). In Sweden, federation-type grocery chains were prevalent with the old consumer cooperatives (Giertz & Strömberg, 1999). In similar principle as with Walmart, Albin Johansson propagated the benefits of industrialization and scale economies towards consumer cooperatives to provide products with good quality and low cost towards consumers (Giertz, 2008). These cooperatives have however mostly transformed into franchised chains with a central node that directs overall strategy and build the brand, while still maintaining a large scale purchasing base.

Other large retailers come from different backgrounds such as IKEA which started out as a furniture manufacturer that later on integrated forward towards retailing their products. The Swedish clothing retailer H&M started out as a single store company in 1947 today having 3 100 stores in 53 markets. Just as IKEA, they work with independent manufacturers, focusing their in-house resources mainly on designing, logistics and retailing. Both companies also franchise stores in some emerging markets, and where attaining the best store location can be a difficult matter. An in-depth study of H&M's replication process is provided by Bengtsson (2008), where she portrays fashion as a volatile industry where exact replication from a template is not always an optimal approach, in contrast to Winter & Szulanski (2001) prescribe, and that the replication process in itself enables internal career opportunities.

Besides retailing, the most common example of replication in local consumer services is restaurants with McDonald's being a text-book example, described in detail by Love (1995). McDonald's started as a restaurant by the brothers Dick and Mac McDonald in the year 1940. With the intention of increasing their service levels they created a slimmed down and static menu in 1948, with only eight courses and a cooking process according to line production principles. It became a success story observed by Ray Kroc, whom sold milkshake machines to the brothers McDonald. Kroc saw the possibility of starting similar restaurants at other locations in the United States, and 1955 he himself became the first franchisee, purchasing the full rights in 1961. Sweden has 230 McDonald's restaurants of which 80 percent are run by franchisees, all together serving 430 000 guests every day. Having mentioned franchising, we will now elaborate on the main type of governing structures in the following section.

5.3 Franchises

It is a common organizational form among replicating organizations. Oftentimes a predominant franchise organization such as McDonalds is referred to when discussing replication as strategy. As a term, a *franchise* can be defined as:

“a long-term contractual agreement between two types of firms – a franchisor who has recognized opportunity and created a new venture to exploit it and a group of franchisees who see the value in the opportunity and purchase the right to replicate the venture in new geographic markets” (Combs, Ketchen, & Short, 2011, p. 413).

Franchise organizations often originate from a business that develops a successful concept on one local market, their brand providing a quality assurance for potential customers, especially in their unfamiliar geographic settings (Brickley & Dark, 1987). The *franchisors* define the concept, package it and license it to other independent entrepreneurs on different local markets, as a quick growth strategy to catch market shares in many places. The entrepreneurs, or *franchisees*, approach the franchisor on their own accord, with a commitment to make significant investments of their own. In turn they are trained, gain support and take on a well-known brand while accepting to offer a well-defined service on a well-defined local market. The franchisees are contracted and thus have no real safety net; should the business not be able to sustain itself in its location, its costs will not be carried by another entity in the franchising network.

A risk that the franchisor takes, should a franchisee fail, is arguably that the brand perception of consumers may be negatively affected; however in a direct financial perspective the only one at risk is the franchisee; which reduces the agency costs for the franchisor, as the franchisee's motivation exceeds that of hired employees (Caves & Murphy, 1976; Lafontaine, 1992). While franchisees do enjoy some independence as a contracted separate business owner, they are often bound to adhere to quality standards, determined product offerings, marketing principles or other constraints. Depending on the nature of the business, the value chain and franchisor revenue model may differ as in a percentage of the franchisees' revenue or a fixed fee.

Other sources of income for the franchisor can come from wholesaling to the franchisees. Mekonomen Group, a car parts retailer, and by extension through their franchisees an auto maintenance service provider, recognized that car parts are not only sold in retail stores but also through repair shops. To increase their market share they integrated forward through franchising. *Sibylla*, a fast-food chain in the Nordics grew by forward integration, expanding from selling to grocery stores to franchising hot dog stands in the 1930s. In both cases, franchisees must also agree to the certain terms of the contract in order to become a sales outlet and take advantage of the attractive wholesale prices.

While these organizational forms of franchising and company owned systems seem clear and distinct from one another, it is worth noting that firms having combinations of more than one category are in fact quite common. Even within the same form of arrangement there may be differences in how they are managed and what the value chain looks like. Oxenfeldt and Kelley (1968) theorized that franchising might be a temporary form allowing for rapid expansion for a young firm, and that firm ownership of all local units is a final goal that all organizations perhaps strive towards. A large, concrete and current example that stands opposite to Oxenfeldt and Kelley's (2008) premise would be Burger King, that divested almost every single company owned outlet in 2013, and became an almost complete franchise based organization. Furthermore, we still see replicating organizations with franchised local units alongside wholly owned local units in the same districts. Bradach (1997) and Sorenson and Sørensen (2001) both argue that a mix of both franchising and firm ownership of local units, a *plural form*, has intrinsic value as it leverages the benefits of both organizational forms which creates an even stronger organization than if operating with one structure alone. But what makes plural forms so effective? Bradach (1997) explains that it keeps control processes fresh and enables an organization to better learn and innovate, while Sorenson and Sørensen (2001) similarly argue that a mix provides a trade-off between exploitation of wholly owned units and exploration of franchised units, explaining that Oxenfeldt and Kelley (1969) do not take into consideration the learning needs of a chain. Bradach (1998) outlines four main premises of a plural form; it (1) allows wide expansion with little needed oversight; (2) helps maintain uniformity of the concept (3) provides local responsiveness through knowledgeable and motivated franchisees; and (4) enables innovation from motivated franchisees that can be tried and transferred through wholly-owned units. His theory was later empirically tested by Cliquet & Penard (2012) to some extent confirming his notions. Relatedly, Kidwell & Nygaard (2011) have also proposed strategic deviance theory, the basis being that all agents within a system have access to information about each other, such as benchmarks indicating each other's business performance. In a plural form it would further lessen the agency costs of monitoring both franchisees and hired managers, with all types of local units competing with each other within the benchmarking system.

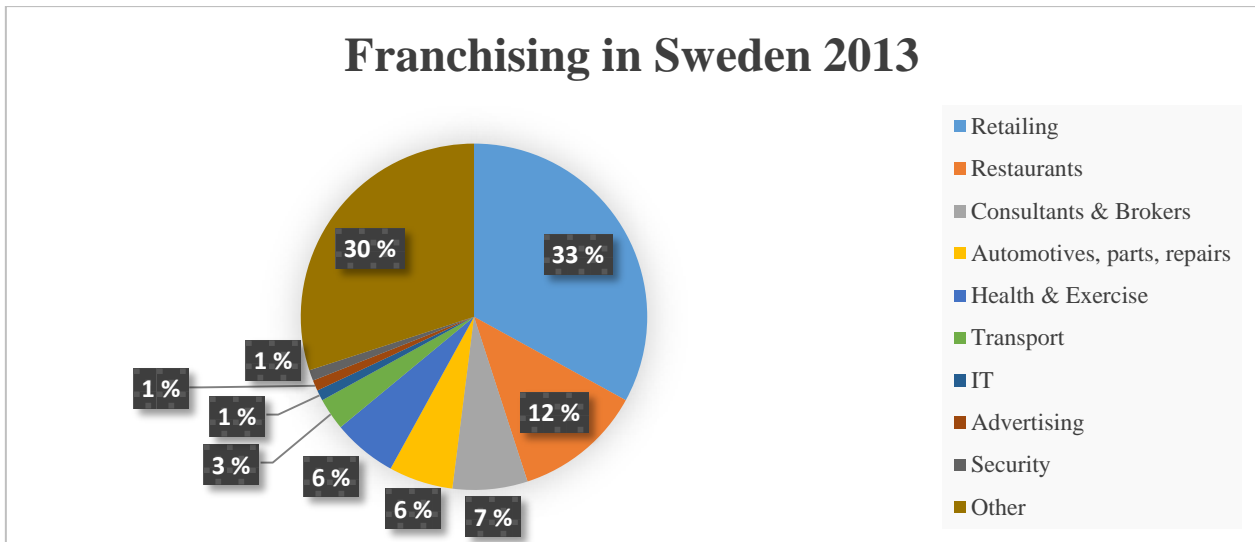


Figure 1. Member firms' sectors share of all franchisors. Adapted from *Franchising in Sweden 2013* (The Swedish Franchising Association).

Franchising has seen a considerable growth in Sweden and has contributed to the growth of replicating organizations in general. In 2012 Swedish franchises employed 110 000 and generated turnover of SEK 200 billion, having almost tripled and increased five-fold respectively since 2002, numbers that correspond to 2.6 percent of total employment and a 5.6 percent of GDP.³ Figure 1 above illustrates the share of each sector based on the data of its members, with sectors such as retail, restaurants and various brokers representing slightly more than half of the total members of franchisors. Most of these firms represented are predominantly within sectors where service is directed at consumers. Secondly, a significant part and top two of the sectors in this chart revolve around the delivery of some type of physical good at the core of the service. At the very surface it would seem as if franchising is an attractive organizational concept mainly for delivering product-based services B2C markets.

5.4 Federations

Federations, as defined by Johnstad (1997) "are formed when two or more actors join in creating a common unit to promote common interests on contracted issues while keeping autonomy on others" (p. 48). They are comprised of existing independent member units, which may or may not be registered firms, and agree upon a form of cooperation. They may in principle compete with each other, although they are often geographically separated. In this collusion, a central type of node firm may be created; one possible path is that the member-firms elect a board that in turn appoints a CEO within the node to run the federation (Edgren & Skärvad, 2014). The logic behind this is to organize and attain economies of scale in several matters by pooling purchasing power for bulk procurements and centralizing administrative functions that are expensive to run in each single member firm. Other benefits include a consistent marketing message, a strong brand value and the possibility of forming standardized training programs to increase competence and quality. The firms entrust the central node organization with directing the collective, but in the long term they are not bound to remain within the federation, as opposed to franchisees who are contractually bound and obligated in many ways. Then again, a member-firm owner that is unsatisfied with the federation executive management does not necessarily have to leave. He or she has the ability to affect the board members and vote for ones that will enforce their opinion regarding what services they want to pay for and how, if the executive team should put restrictions on members or if they should continue to run the node of the federation (Edgren & Skärvad, 2014). As it stands, Johnstad (1997) declares that federations are not common in organizational research, yet they are a fair part of the service industry in Sweden. An example of a federation system is the Swedish company Praktikertjänst AB, a small scale business in dentistry and health care, employing almost 9 000 people at nearly 2 000 clinics. It is owned by 2 150 shareholders or partners that act as operating managers at their respective clinic. The managers and their employees at every local unit all share the same employer, in practice however it is more of a chain of independent businesses. Together they fund a central node in the organization, and every local unit or clinic more or less functions as a firm within the firm. Each shareholder is responsible for their respective clinic's profitability and must adapt their expenses, investments, salaries and pension benefits to the revenues of their clinic. A similar setup to that of franchising, where local managers are motivated through some degree, yet more decentralized in terms of power in the long run.

³ *Franchising in Sweden 2013* (The Swedish Franchising Association). Numbers represent only their member firms.

5.5 Are B2B Local manual service providers replicating organizations?

We have seen that an important capability in replicating organizations such as retailing is to integrate several factors. In retailing, for example, possessing a supplier advantage must be coupled with a distribution advantage at several different geographical locations or electronic channels if the organization is to maximize its sales. This is often combined with scale advantages in purchasing since large quantities of products are sold through these channels. The course of action for many actors has consequently been to replicate its unique business concept across several retail outlets. In the case of local manual service providers on the B2B market, being large and having many local units spread out geographically enables them to serve very big client firms whom also may have offices or factories at many locations in different cities. This implies that one important factor behind the development of large corporations providing local manual services on the B2B market is that their customers want to buy services at different locations from the same vendor. On the B2C markets individual customers act independently from customers on other locations. In B2C markets growth is perhaps more related to the creation of globally similar consumption patterns.

Franchising allows for fast growth, aiding to this purpose of spreading distribution channels on a wide geographical market, and as we have seen, franchising is a growing phenomenon mainly in B2C markets. In regards to local manual service production on the B2B market however, the large service companies have not expanded by franchising but rather through organic growth and mergers and acquisitions. The acquiring companies have very often taken over both local managers and workers from their future customers, subsequently run these (and other) local units as wholly-owned ones rather than critically handpicking the new local managers and having them invest in the unit itself.

Much of the literature focuses on either product distribution sectors, or sectors where a product is a core part of the service offering, or on franchising on the B2C market. With franchising, as well as with federations the literature identifies several benefits of a franchising system such as reduced capital investments and reduction of moral hazards resulting a reduced agency cost (Caves & Murphy, 1976; Lafontaine, 1992; Edgren & Skärvad, 2014). There are also several further benefits granted when combining organizational forms (Bradach, 1997). These are however benefits that wholly-owned organizations may not reap, along with little obvious scale economies, at least to the naked eye. This raises the question as to why large service companies within the B2B market are growing on such a scale despite no obvious advantages related to size. They cannot motivate a local manager with ownership of a unit, their nodes do not wholesale products to local units as a sole income source. For the organization to generate profit, there must be a high focus on human productivity, and human productivity requires competent leadership and well defined work methods, as well as the proper mechanisms that develop both. This leads to new questions such as whether these firms share similar management models and methods as more traditional and common replicating organizations, such as retail chains and franchising organizations? Can they enhance their organization by integrating IT systems the way Walmart does? Are they able to enjoy scale economies in the same way as the other replicating organizations? Do they have tournament-like ranking between local units, as Kidwell & Nygaard (2011) propose for franchises? The questions are numerous, and so far the answers are few.

6 Conclusions

Different to some foundational concepts of service management such as the moment of truth, and aged compared to newer definitions of services that criticize IHIP, local manual services within the B2B sector seems to reside in a category of its own. Yet their organizational characteristics are strikingly similar to that of replicating organizations, which highlights some gaps in the literature of service management. We have also seen that local manual services have not left an imprint on the existing theory, implicitly or explicitly. The field, however, share a similar backdrop as retailers and chain restaurants in the theory of replication as strategy. Some questions that arise from this organizational similarity is if these large local manual service providers are attempting to realize economy of scale, establishing standardized working methods, routinely improving and diffusing best practice, developing systems for quality assurance, and systematically streamlining offers and routines. Alternatively, how do such efforts manifest themselves in a pure service firm?

Given the relatively little research we have found in the literature study on wholly-owned international local manual service providers on the B2B market, and that they are becoming increasingly significant employers, we argue that there is a great need for research aiming at understanding these organizations. More specifically, we strongly call for studies upon the management of these replicating organizations. Including but not limited to: usage of key performance indicators, service process development, leadership development, ranking systems, incentive and compensation systems, creation and diffusion of best practice etc. In short, how management harnesses productivity within the large replicating organizations providing local manual services on B2B markets.

Another stream of research should aim at providing better understanding of how and why these forms of organizations are able to grow. This research will apply replication theory and theories on service management to study factors related to standardization and growth. As we studied the service management theories we also saw that this research to a large extent has been focusing on B2C-services and there is a need to pursue research on B2B-service providers.

Lastly, research may also be focused on the transformation of the industrial society to a post-industrial society, in which the organizational forms we have studied play an important role. As we have discussed, an explanation as to why

these forms develop is that corporations outsource some activities they deem to be outside their core business. Specialized replicating organizations are then able to perform these activities as a core business and use replication strategies to grow not only nationally but also internationally.

Given the uncharted nature of the area, we propose in-depth case studies focusing on different aspects such as the ones listed above, in order to better understand and explain the nature of these emergent organizations and how they are managed.

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Development of Cultural and Creative Industries in China

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This paper focuses on the development of cultural and creative industries in China. The concept of this industry is much later origin than in the Western countries, but it has raised high attention from the central government recently. It developed very rapidly during past decade when China is experiencing the economy transition from 'manufacturing' to 'services'. Our study aims to distinguish China's specific concepts and characteristics, to learn current situational factors and drivers, and to target the challenges and future trend of cultural and creative industries in China. In addition to the established Western literature, we utilize a number of studies, including literature and documentary materials in both English and Chinese, carried out by Chinese scholars. Our empirical study is mainly based on the experience of a Western 3D company which is actively looking for business opportunities in the cultural and creative industries in China. This experience has been illustrated through interviews in the company and among its partners and potential clients.

1 Introduction

Cultural and creative industries, closely linked to KIBS, have attracted the interest of an increasing number of researchers in the field of innovative economics (Müller, et al., 2009). They have had a significant contribution to the economy over the past two decades, particularly in terms of employment, regional development and urban dynamics (Andari et al., 2007). The concept of cultural and creative industries has gained popularity in Western countries since 1990s, but arrived in China later: during the 2000s (Banks and O'Connor, 2009; Keane, 2009). Currently, China is experiencing a transition from an investment-led economy into a consumption- and service-driven economy. The Chinese government starts to regard cultural and creative industries as part of its long-term economic vision (O'Connor and Gu, 2006). The developed cities in the Eastern part of China, such as Beijing, Shanghai and Guangzhou, have especially become interested in this industry to build the 'knowledge economy' (O'Connor and Gu, 2006). Cultural and creative industries are also considered as new growth opportunities for this huge emerging market, to meet the growing demand of the 13 billion populations, especially the younger generation. In the Chinese government's 12th Five-Year (2011-2015) Plan (NDRC, 2011), the average annual growth rate of this industry is supposed to be around 20%, much higher than the general GDP growth.

However, cultural and creative industries in China have their unique characteristics and development trends when compared to Western countries. Our paper focuses on this topic to distinguish these specific factors in China's socio and culture context. We proposes the following research questions: 1) what are the specific concepts and characteristics of Chinese cultural and creative industries compared to the development in the Western countries; 2) what are the current situational factors and drivers of cultural and creative industries in China; and 3) what kinds of factors influence the development of Chinese cultural and creative industries and their future trends in China.

The structure of this paper is as follows. After this introduction, we open up the concepts and characteristics of cultural industries, creative industries, and cultural and creative industries from both Western and Chinese perspectives. Thereafter we tackle the detail of China's current situation and drivers in this industry. It is in the early stage but government support and large consumer demand mainly drive its rapid development. Then we continue our discussion with the challenges and future trend of cultural and creative industries in China. Piracy and censorship are the barriers for its future development. Chinese traditional Confucian culture may also hinder creativity in this industry. All these parts are based on the literature study from both Western and Chinese scholars, as well as policy documentation reports. Before final concluding discussion, we also supplement our study with practitioner's view in a small-scale case study via interviews and discussions among different stakeholders in the 3D field.

2 Concept and characteristic differences

The term *cultural industries* has been frequently used in cultural analysis and policy for many decades, and recently it has been joined by another popular phrase *creative industries* (Hesmondhalgh, 2008). Since there is little clarity or official explanation of the differences between cultural and creative industries, they are often used interchangeably (Galloway and Dunlop, 2007). The concept of cultural industries was first coined by Theodor Adorno and Max Horkheimer in 1947 with their essay 'The Cultural Industry: Enlightenment as Mass Deception' (Adorno and Horkheimer, 1979). They used this term to refer to *industrially produced commercial entertainment*, including broadcasting, film, publishing, recorded music, visual and performing arts, museums and galleries, etc (Horkheimer and Adorno, 2002). This understanding underpinned the cultural industries policy initiatives of the United Educational, Scientific, and Cultural Organisation (UNESCO) (Galloway and Dunlop, 2007).

The concept of creative industries emerged in 1990s primarily as a policy discourse (Flew and Cunningham, 2010). The Creative Industries Mapping Document (CIMD, 1998) in the UK has first defined creative industries as *'activities which have their origin in individual creativity, skill and talent and which have the potential for wealth and job creation through generation and exploitation of intellectual property.'* It not only refers to traditional cultural industries including resolutely analogue (arts, crafts, antiques, architecture) and established commercial business sectors (TV, radio, film) in the modern society, but it also extends portfolios to emerging digital sectors (e.g. interactive leisure software) in order to capture significant 'new economy' enterprise dynamics (Cunningham, 2002).

Cultural and creative industries have been interpreted differently in the international markets. For instance, Germany, the Netherlands and Korea prefer to use the term of culture industries, whereas the UK used to adopt the concept of creative industries. Spain used to refer it to culture and leisure industries. In addition, the U.S. addresses the similar industries as copyright industries, whose primary purpose is to create, produce, distribute or exhibit copyright materials, including videogames, books, newspapers, periodicals and journals, motion pictures, recorded music, radio and television broadcasting, and even computer software (Siwek, 2013). Japan prefers to call it as content industries, which highlight video games, animation, cinema, music, broadcasting, book and newspaper industries (Xu, et al., 2011). They all represent the domain of cultural and creative industries, even though there is no uniform name or definition in different countries.

In China, both cultural industries and creative industries are of much later origin and have developed later than in the Western countries. The term of *culture institutions* is more suitable to characterise the nature of China's cultural development in the socialist orthodoxy from 1949 to 1979, since culture during this period was mainly described in conventional Marxist terms as the superstructure reflecting the base or the economic reality (Keane, 2004). The *industrialization of culture* starts right after Deng Xiaoping's 'open door' policy. The concept of *culture market* has existed since the early 1990s in policy discourse when China was deepening the reform to a market economy (Keane, 2004). Thus, a turn towards the term *culture industries* has been witnessed in the late 1990s in China. The booming economy and large consumer market in China have also generated a huge demand of culture industries, especially in new media and value added services after 2000s.

The concept of creative industries has come to China somewhat late in 2004 (Keane, 2009). It is in the right time going through the transition trend in China from 'manufacturing' to 'services' for the industry upgrade, with the mindset 'create or design in China' instead of previous only 'made in China'. The key term of creativity has also matched with the Chinese policy concept of 'innovative nation' during this period, when many Chinese scholars have exploited the significance of creative industries on China (Keane, 2009). For instance, Li (2008) defines creative industries in his book 'Creative Industries are Changing China' as *'those industries that rely upon creative ideas, skill and advanced technology as core elements, increase value in production and consumption and create wealth and provide extensive jobs for the society through a series of activities'* (Li, 2008, pp. 3). In his definition, advanced technology has been regarded as one of the core elements, which may not be considered as a necessity in traditional cultural industries in China.

Since creative industries has a natural link with cultural industries in the international markets, China has even combined these two terms together as the *cultural creative industries* (*Wenhua Chuangyi Chanye*), which is a combination of culture, creativity, and information technology, with the characteristics of high added value, high intelligence, and strong convergence (Xu and Yao, 2012). However, it is not that common way to express such terms in the West. In order to match Western expression, this combinatory term has adopted an official English translation '*cultural and creative industries*' in the policy discourse (Zhang, 2011 b). The concept of cultural and creative industries has been first time written into China's 11th Five-Year (2006-2010) Plan in 2006 (NDRC, 2006), whereas it was defined in Taiwan earlier in 2002, as *'the industry to enhance the overall quality of life, with the potential to create wealth and employment opportunities from the creative or cultural accumulation and use of different forms of intellectual property'* (CCA, 2004).

Although there are still divergent views on the detailed definitions of cultural and creative industries after it arrived in china, many Chinese scholars believe this is a driver of regional growth based on modern science & technology and cultural resources (Deng, 2007). As we mentioned earlier, this industry has various names in different countries, which reflects their economy reality and development focus. For instance, the UK focuses on branding of creative products and the U.S is keen patent development and protection of intellectual property; In Japan, game, animation and other entertainment are the major parts of its content industries (Xu and Yao, 2012). However, cultural and creative industries in China emphasize on both the heritage of traditional Chinese culture and the utilization of advanced technology (Li, 2008; Xu and Yao 2012).

3 Current situation and drivers in China

Different from many Western countries, cultural and creative industries in China is still at the exploratory stage, and it has not formed a comprehensive industrial chain yet (Xu and Yao, 2012). Although China has abundant cultural resources, it is relatively small as the provider of cultural and creative products in both domestic and international markets due to slow development in this field before 2000s. Cultural and creative industries has recently become a hot topic in China only after it has been raised by the central government in 2006 (Xu and Yao, 2012). Since then, more than half of provinces in China start to include cultural and creative industries in their local economy development

planning (Zhang, 2010). The production of cultural and creative industries in China has grown by 60 times in only 10 years to 1,807 billion RMB, accounting for around 4% of GDP (NBS, 2013).

Many of cities in China are interested in learning the successful experience in content industries from Japan, and regard animation as a key part in the development of cultural and creative industries (Zhang 2011 b). China produced domestic cartoons in TV about 400,000 minutes, more than in Japan, in 2009; however, the quality and profitability are questionable, because government's financial support in this field is even able to buy all these domestic cartoons based on current production cost (SARFT, 2010). The excessive protection and support policy leads to the dependence on government business - many enterprises even use their 'guanxi' network to turn the government as a client (Zhang, 2011 b). This phenomenon causes unfair competition and lower the effectiveness of financial resources.

At the same time, numerous cultural and creative industry parks have been built in different regions in China (Zhang, 2011 a). The emerging cultural and creative industries in many parts of China, especially in less developed areas, still lack contents, in terms of the entry of enterprises and experts. Some local governments in these regions only follow the trend to build industrial parks, without a complete follow-up planning. So far, China has three cultural and creative industry clusters mainly in the relatively economy developed regions in the Eastern part: Beijing, Shanghai and Guangzhou area (Zhang, 2011 a). Cultural and creative industry development meets the economy transition requirement in these regions.

Both grassroots and elites have realized that traditional industrialization with high-consumption and high-pollution model cannot continue for long, but low-carbon and green economy will become an important direction for China's future development (Zhao and Huang, 2011). Following the success in the exploitation of the 'World Factory', China is now attempting to explore new possibilities: cultural and creative industries can be defined as a transition project for its national policies and services (Cai and Cai, 2011). On the one hand, Chinese consumers' non-material needs are growing along with the economic booming during the past three decades and there are huge demand for constant renewal of knowledge and ideas. On the other hand, economic globalization increases the international competition and drives China to enhance core competitiveness by added value of products and services (Hu, 2007). This industry also plays a key role for China to demonstrate its soft power in the global market, even though it is still very weak at this stage.

4 Challenges and future trend in China

At the policy level, the government's promotion of 'cultural and creative industries' aims at a transition from 'manufacturing' to 'services'. However, there are certain practical barriers against creativity in China. First of all, the piracy phenomenon is still popular. Although China has enacted its first copyright law in the early 1990s, the implementation of this law has been very poor so far (Montgomery and Fitzgerald, 2006). For instance, pirated DVDs and CDs are hampering the development of China's domestic marketplace and creating ambivalence to international investors (Keane, 2004). China's illegal distribution channel is well established, offering a full range of high level services (Montgomery and Fitzgerald, 2006). It is estimated that the piracy rate in film and music accounts more than 80% of the market share (Montgomery and Fitzgerald, 2006). The consumers are used to get free access to those cultural and creative products.

In addition, the strict censorship regulation from the traditional cultural industry has restricted individual's creativity and enthusiasm (Montgomery, 2010). The strict censorship regulation origins from the ideology control of previous cultural institution since the establishment of the Chinese Film Bureau (Montgomery, 2010). The censorship committee was set up in this bureau to decide if the film, animation and documentary scripts were suitable for production to the public (Zhang, 2004). Although the economy reform has carried out for more than three decades, the political reform in China has still been lagged behind. The censorship on cultural and creative industries continues by the State Administration of Press, Publication, Radio, Film and Television of the People's Republic of China (SAPPRFT).

Interestingly, Chinese traditional Confucian culture may eschew innovation without breaking 'the patterns of the past' (Keane, 2009). The Confucian view was that a sage does not create but merely transmits (Makeham, 2003). This might be another angle to explain why there is much less radical innovation than incremental innovation in China. While the copyright cannot be well protected and there is a risk to pass the strict censorship, many local culture and creative producer may hesitate to put many efforts and high cost to realize the innovation. On the contrary, they are more willing to 'Shanzhai', "to copy" and "to parody" as self-aware, casual, and public behaviour (Hennessey, 2012).

The economic development of a country will increasingly rely on cultural and creative industries when it reaches a certain level from past experiences of world economic development (CPMJ, 2014). As we mentioned earlier, current rapid development of cultural and creative industries mainly concentrates in the Eastern part of China due to their better economic development level. However, there is a huge potential in Western part when China starts to balance the regional differences in the near future. From the whole China perspective, national citizens' average culture consumption, also including imported cultural and creative products, only takes up about 7% in their family expenditure, which is much less than the U.S. and Western Europe's 30% (CPMJ, 2014). There is a large room for improvement at least in the domestic market.

Currently, there are only less than 1 million talents, who are working on cultural and creative industries in China, but the talent needs in this industry during the 12th Five Year (2011-2015) Plan (NDRC, 2012) is more than 10 million based on the industry growth and consumer demands (Su, 2011). The shortage of domestic talents indicates that

homogenous cultural and creative products may not meet the growing demand of domestic consumers. There are huge opportunities for Western providers in this industry to sell their products and services, some of them with strong Chinese culture elements, to China. The Chinese government has also realized this reality and utilize strong financial support to encourage young talents to start with this industry. Recently, the 'going out' of Chinese culture has even become an important part of China's reform and opening-up policy, with the hope to improve China's international impact (CPMJ, 2014).

5 Illustration from practitioners' experience

In order to illustrate the experience of practitioners involved in cultural and creative industries in China, we have conducted a small-scale case study in a Nordic 3D company which is actively looking for collaborations and opportunities for 3D content and display solution business in China. We have interviewed three members from the case company (two of them from the top management and one of them with Chinese working experience) and six of its potential partner representatives. In addition to these formal semi-structured interviews, we have also participated three exhibitions and two seminars in 3D areas. These activities offered us the platforms and opportunities to discuss with different stakeholders in this industry, including potential customers, solution providers, 3D experts, etc. Since cultural and creative industries has a broad range of portfolios, the interviews and discussions on 3D business in China supplements our views on challenges and opportunities in this industry from a specific segment perspective.

Our case company is in the very early stage to enter 3D business in China. In order to reduce the internationalization investment risk, the company prefers to first deliver 3D services that do not require physical transportation of goods (e.g. 2D to 3D conversion services). Since the company does not have any physical presence in China yet, they want to work closely with local partners, as one of the representatives from the case company mentioned that:

"In China we recognize that we cannot get anywhere without well-connected local partners, so screening and finding the right partners is vital in order to penetrate the Chinese market."

In this less matured industry, collaboration with partners is very important. The company have sent the experts to travel and work in China in order to build local networks, and identified suitable partner candidates. They prefer to have such partners with certain government background or access due to a large amount of government related business and influence in this industry. However, this process goes somewhat slow when it takes time for the case company, as a SME (Small and Medium Enterprise), to prove their capability and credibility and win satisfactory partners' trust.

Although Chinese traditional Confucianism, to some extent, hinders radical innovation or creativity, the Chinese are keen on learning the new technology, and adapt it to the local needs incrementally. It is very important for our case company to introduce new and high technologies in 3D field to the partners, and work together with them to adapt the local clients' requirements. This co-creation process with partners not only adds value of offerings to clients but also gains government's preference. One of the potential partners emphasized that:

"Role of technology has been crucial in China. We have constantly screened the market for new technological developments, especially when the technology acts as a limiting factor in some platforms in the local business."

China has been regarded as a huge 3D markets, since it has the largest number of 3D cinema screens at the moment and the Chinese government has planned to launch at least five 3DTV channels by the end of 2015. However, 3DTV channels have only been made a slow progress so far in the practice. Current operation model of CCTV 3D channel has a serious problem. The government set up the rule to request six local TV channels to provide certain 3D contents for free or with a very low purchasing budget. Thus, there is lack of excellent programs due to the government's planning economy mindset on this issue. The related companies are not willing to put advertisements on this niche distribution 3DTV channel when audiences have been driven away. One of 3DTV officials and experts also raised that:

"The most important thing in 3D is the contents. When audiences left because of the poor contents, it is much more difficult to attract them back in the future. We have realized this issue and need to improve our budget to make better contents."

It is not difficult to make the 3D contents, but it is a challenge to produce high quality contents with impressed stories. Current 3D markets in China are mixed with much more low quality and much less high quality 3D contents. There is a lack of capable talents and related technologies to meet local consumers' growing demand when many of their attitudes towards 3D have been changed from "fresh and interesting things" to "excellent experience". This provides a good opportunity for our case company in this niche premium market, as one of the case company representatives perceived that:

"We have a good chance to sell our high-quality but cost-effective 2D to 3D conversion services to the Chinese market. We are also interested in joint concept development with local partners to suit Chinese consumers' preferences."

6 Concluding discussions

Cultural and creative industries is quite a recent category in academic, policy and industry discourses in China. The industrialization of culture after 'open door' policy in 1979 makes China experiencing a transition from culture institutions to culture industries. Culture products not only reflect national socialist orthodoxy, but also become commodities in the culture markets where the citizens can purchase and consume it freely. Creative industries has arrived in China even late in 2000s. This term matches its national policy to create an innovation country when China is at the stage of industry upgrade. Soon after, China has combined both terms together and created its own words 'cultural creative industries' (Wen Hua Chuang Yi Chanye) in order to emphasize the creativity and utilization of technology in traditional cultural industries on the policy level. Although it has been officially translated into 'cultural and creative' industries in English, the Chinese way to express 'cultural creative industries' integrate culture and creativity much more firmly as a whole.

Cultural and creative industries has developed impressively rapid since it gets popular in China in 2000s. It is not only driven by the central government's policy and financial support during the economy transition process, but also due to the growing demands from the large consumer markets along with increasingly improvement of living standard and mindset change in life style. Numerous cultural and creative parks, especially with animation theme, have been built in a very short time in different regions in China. However, it also causes certain problems. For instance, some of these fast-built industrial parks are lack of entry enterprises and experts; some of these parks are part of reconstruction projects – incapable animation enterprises only produce simple and repetitive cartoons by using government financial support.

Besides, some practical barriers also exist and hinder the development of cultural and creative industries in China. The piracy phenomenon is still common after 2000s. It is understandable that the legal copy of films (DVDs) or music (CDs) were too expensive for normal Chinese consumers one or two decades ago when they still had very low income. Nowadays, these consumers still keep previous behaviour to enjoy free of charge access to pirated copies from the internet. The copyright consciousness in Confucian culture might be less visible than in the Western culture, when the Confucianism views a sage does not create but merely transmits. In addition, the Chinese government support in cultural and creative industries is also debatable. On one hand, the government does offer the financial support; on the other hand, the strict censorship regulation, to a large extent, hinders the key element 'creativity' in this industry.

There is still a large potential for the development of cultural and creative industries in the whole regions of China. In the Eastern part, three clusters (Shanghai, Beijing, Guangzhou) in cultural and creative industries have attract many young talents and start to form certain levels of the industry chain based on the strong consumption power in these regions. In the Western part, although no such clusters have been formed yet, they keep better original culture resources. The government's on-going 'West development' policy will definitely benefit their development in this field in the near future. Moreover, the demand of cultural and creative industry talents in China is at least 10 times more than the existing capable ones. It leaves an excellent opportunity for both domestic and foreign providers in this industry.

The case study illustrates the experience of practitioners and supplements our views on challenges and opportunities from the perspective of a specific segment, 3D business as an emerging part of cultural and creative industries. In the unmaturing industry, the connection with a broad network is very important. Especially in China's business context - 'guanxi' before business, finding a right partners is vital to penetrate the markets. Advanced technology has been highlighted as a significant brand in China's 3D industry, and it can even be acted as a 'door knock' when dealing with both partners and customers. Along with the economy booming, local consumers' demands on high quality 3D contents are dramatically increasing. The premium market in cultural and creative industries in terms of 3D business at least is more prosperous than traditional industries, such as manufacturing. However, this empirical study is only based on a small-scale Nordic case in 3D industry. It requires more broad research on other fields in cultural and creative industries to tackle China's contemporary situation and future trend. In addition, the influence of Chinese traditional Confucianism on cultural and creative industries is an interesting topic and worth to do further research.

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A Classification of Skills and Competencies for the Domain of Renewable Energies⁴

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Human resources are an essential factor for providing services. For an optimal match between employees' capabilities and service activities, it is necessary to precisely define skills, competencies, and qualifications that are required. This paper presents findings of an investigation of competencies in the domain of renewable energies. Based on a unified classification system, it is presented how to use this classification for describing service activities and for mapping employees.

1 Introduction

The description and formalisation of competencies required for service provision is a challenge in a variety of industrial domains. This is caused mainly by a lack of terminological standards of central concepts. As a result, it is possible that organisations have problems in creating an appropriate allocation of human resources to services. Furthermore, job offers cannot be formulated clearly enough to address proper applicants.

The focus of this work is on the domain of renewable energies. Besides terminological inconsistencies, this domain is also characterized by a large number of legal regulations and certifications. Service providers usually need to adhere to several regulations using different terminologies at the same time.

The aim of this work is to present a theoretical and structural basis for developing a harmonized terminology of skills, competencies, and qualifications⁵ in the domain of renewable energies. The terminology is hierarchically structured and embedded in the existing classification system *ESCO*. Thus, interoperability can be ensured.

As a result of this work, a classification of skills, competencies, and qualifications to provide renewable energy services was established. This classification scheme can be used as a reference model regarding terminology and hierarchical structuring of key domain concepts. Using the classification has two main benefits. First, companies are able to publish improved job offers, since the standardized terminology reduces ambiguity. Accordingly, companies are able to appoint suitable employees for the vacant position what can result in a higher service provision quality.

In a more advanced setting, the classification can be used company internally for supporting service provision. It is possible to record competencies of existing employees. Based on this, service processes can be assigned with appropriate employees.

A notable service provision performance enhancement can be achieved by complementing reference processes (e.g. in terms of a standardised portfolio) with reference competencies. In doing so, uncertainty about whether companies may provide additional services can be reduced. Furthermore, it is possible to assess costs for providing services by comparing necessary competencies with costs of particular employees. Additionally, the classification provides an optimal basis for the more detailed description of resources by extended attributes.

For providing an overview about the research outcomes, this paper is structured as follows. In the next section, additional motivation for the research is given by presenting competency management approaches. The data collection process is presented in more detail in Sect. 0. Bases on these data, a structure was established and is shown in Sect. 0. Section 0 gives an overview on how to apply the classification in praxis using the structured data. Finally, the paper is concluded in Sect. 0.

2 Motivation

It is a long-known fact that resources play an important role for business success (Barney, 1991), i.e. a company using its resources in an optimal way has a competitive advantage compared to its competitors (Peteraf, 1993). Besides technical resources (e.g. a measuring device), human resources (e.g. a purchaser) are an integral part of service provision and, thus, need to be planned according to the skills, competencies, and qualifications they possess and can offer for executing specific activities.

The term *competency-based management* is used to describe an organisational approach for identifying knowledge that is necessary for performing specific activities (Draganidis & Mentzas, 2006). Competency-based management has a variety of application areas, e.g. workforce planning, recruitment management, learning management, performance management, career development, and succession planning (Draganidis & Mentzas, 2006). To be helpful in these

⁴ The project EUMONIS (www.eumonis.org) on which this report is based was funded by the German Federal Ministry of Education and Research (BMBF), funding codes 01IS10033D and 01IS10033K. EUMONIS was supervised by the project sponsor German Aerospace Centre (PT-DLR). The BPMN models were created using the web-based software Signavio as part of the Signavio BPM academic alliance.

⁵ At some points of the text the denotation competency is representative used for skill, competency and qualification.

application areas, the competency-based management process consists of the following steps that can be supported by a *competence management system* (Lindgren, et al., 2004): specification of competency needs, identification of competency gaps, competence sourcing, competence development, and project staffing.

On the one hand, a company needs to be aware of the competencies different employees possess. On the other hand, clearly defined competencies are a means for creating precise job offers and for hiring new employees. For doing so, it is necessary that the company has a clear understanding about the meaning of different competencies. In this direction, Winterton, et al. (2006) provides an aggregative study about definitions of relevant concepts. While knowledge can be defined as the “result of an interaction between intelligence (capacity to learn) and situation (opportunity to learn)” (Winterton, et al., 2006, p. 25), skills are “used to refer to a level of performance, in the sense of accuracy and speed in performing particular tasks” (Winterton, et al., 2006, p. 26).

Though this type of meta-research is important for laying theoretical foundations regarding skills, competencies, and qualifications, practically applicable methods and tools need to be made available for companies. That is, companies must be provided with insights about how to apply a set of competencies for their daily work. To facilitate this activity, several company-specific competency dictionaries have been established. For example, the “NASA competency management system”⁶ provides a structured overview classified according to different domains.

However, company-specific competency lists are not sufficient due to two reasons. First, an increasing amount of work is outsourced to other companies. To find suitable partners, a precise description of necessary competencies is required. Second, a clear description of competencies is necessary for job offers, too.

Domains like renewable energies are still in their infancy regarding clear and precise job descriptions. This is based on the fact that a variety of companies uses non-standardised names, thus, resulting in different names for equal competencies. The problem is further complicated since a variety of different standards for describing product-related facts but only a handful of preliminary standardisation approaches for service provision exist. Thus, the activities conducted in this area are described in different diverse ways that might not be compatible with each other. Sonnenberg, et al. (2013) presents a survey in the renewable energies sectors identifying a strong demand for supporting the provision of services by optimizing resource planning, selection, and use. To overcome an aspect of this problem, in this work a proposal for structuring skills, competencies, and qualifications in the domain of renewable energies is presented.

3 Data Collection

The collection of relevant skills, competencies, and qualifications was established by analysing different information sources from the domain renewable energies. First of all, company specific concepts were extracted from job offers, description of existing services, workshops with service providers, and documentation of service processes. Furthermore, it was possible to extract necessary competencies by role descriptions of companies. Competencies that are not bound to a specific organization were identified by scanning existing training materials for certificates in the domain renewable energies. Existing classifications, thesauri, and taxonomies of skills, competencies, and qualifications that are the result of several standardisation approaches were used as complementary sources. In the following, the extraction process for the different information sources is presented in more detail.

Job Offers: Companies in the sector of renewable energies are continuously searching for qualified employees. Due to this fact, a multitude of job offers from companies were analysed for skills, competencies, and qualifications. Besides identification of relevant concepts, the job offers can also be used to establish relations between concepts. This is due to the fact that job offers usually consist of a job name (e.g. head of quality management), responsibilities (e.g. auditing), and necessary qualifications (e.g. graduation in economics).

Workshops: During workshops with several representatives of renewable energies companies, the whole classification was improved iteratively. Thus, the results of these workshops were twofold. First, the companies verbally described competencies necessary during a discussion. These competencies were then integrated into the existing ones. Second, the companies evaluated existing previously found competencies according to their practical relevance.

Service Descriptions: Various service descriptions of different service providers were analysed. There are two types of descriptions. On the one hand, services are described for internal employees to support the provision. On the other hand, descriptions for a customer-oriented presentation of the services are provided.

Based on these descriptions, it is also possible to derive service characteristics. For example, Verma (2000) defines four types of services based on the dimensions degree of customer contact/customisation and labour intensity. According to the specific value of a dimension, different competencies are necessary, e.g. a service with a high degree of customer contact must be provided by employees that can interact with customers in a suitable manner.

Service Process Documentation: Due to the growing complexity of services, more and more companies use Business Process Management (BPM) for managing their service processes. In doing so, a variety of different process models was established in the last years. These process models contain rich information about necessary skills, competencies, and qualifications for services.

Existing notations like Business Process Model and Notation (BPMN), Event Driven Process Chains (EPC), or UML Activity Diagrams (AD) allow for defining the activities that need to be performed to provide a service process.

⁶ <http://ohr.gsfc.nasa.gov/cms/home.htm>

Figure depicts a process snippet from a company using BPMN. The presented process specifies an alert management service. After receiving an alert message, the operational manager has to login to the specific program of the plant manufacturer that was source of the message. This might either be a so-called Condition Monitoring System (CMS) or a Particle Sensor. She then has to check the status of every installation using the company-internal *GreyTime*⁷ database or a specific manufacturer program. If fielding is necessary, a separate process (failure management) needs to be started using the IT system *ROTORsoft* and the process ends. Otherwise, the operational manager needs to check whether a documentation of the incident is necessary. If documentation is required, she writes it into the event database and the process ends.

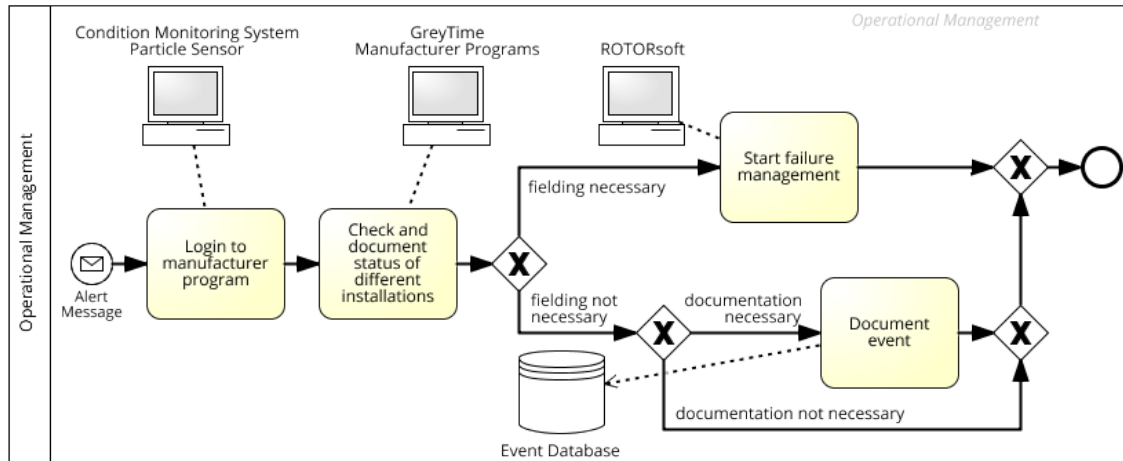


Figure 1. Sample process as source for skills, competencies, and qualifications.

In addition, it is possible to assign a role to an activity to specify who is responsible for performing this activity. A role might be a specific employee, an employee group, or a division of the company. The role names can be used as an indicator for required skills. For the process shown in Figure , the role *Operational Management* might indicate skills that are defined in a role description (see below in paragraph Role Descriptions). Similar to job offers, it is possible to define relations between roles and competencies by analysing which roles have to perform which activities. Besides roles, the depicted IT systems and databases can be used as an indicator for required skills and competencies of the role *Operational Management*. For example, executing the first activity *Login to manufacturer program* requires using (and, thus, knowledge in) the *Condition Monitoring System*.

In addition to explicitly stated information like role names and IT systems, it is also possible to extract necessary competencies from activity names. For example, the activity *Login to manufacturer program* requires general knowledge on how to use IT systems. Using these information sources, a detailed overview about necessary skills and competencies can be extracted. Additional information might be found by using (semi-)automated techniques for retrieving business process resources, e.g. Cabanillas, et al. (2014).

Role Descriptions: As stated above, several companies have established a framework for describing employee roles. In doing so, it is possible to provide additional information for specific roles that can be used in process models. Usually a role can be described similar to the examples shown in Table . It consists of the role name as an identifier, a precise summary about the purpose of the job, e.g. the activities that are usually performed by this role. In addition, several requirements for employees that are assigned to this role can be defined, e.g. necessary certificates (cf. training materials below). Besides internal usage for assigning roles to activities, role descriptions can also be used for creating job offers.

Table 1. Role descriptions, gathered within the research project EUMONIS.

Role	Description	Duties and Responsibilities
Plant Operator	Is the owner of a plant and responsible for the correct plant operation.	Operational processes Managerial authority Legally responsible
Plant Manager	Is in charge of the technical operation of a plant.	Technical operation Coordination of tasks and resources Optimisation of appointments

⁷ Due to intellectual property reasons, the name of this company-specific tool was anonymised.

Role	Description	Duties and Responsibilities
Planer	Is in charge of planning the complete plant or components thereof.	Construct, design, and planning of the plant Monitor construction Define technical parameters
Purchaser	Is in charge of all operational activities which are associated with the order within the supply of materials, goods and equipment.	Purchase materials, goods, equipment Handle ordering processes Determine purchasing policy, procurement market research
Installer	Is in charge of building the complete plant or components thereof.	Build plant Put plant in operation
Service Employee	Is in charge of providing miscellaneous services for technical activities.	Maintenance services Documentation of work steps Perform remote access

The textual description of roles is an initial helpful step for identifying who is able to perform specific activities. This can be extended by the hierarchical structuring of different roles as shown in Figure 2. Based on this figure, roles can be distinguished from each other in more detail. While there are two roles with the name *Sales Representative* in the example role model, these roles do not specify the exact same roles. Instead, both roles are located in different departments and require slightly different competencies.

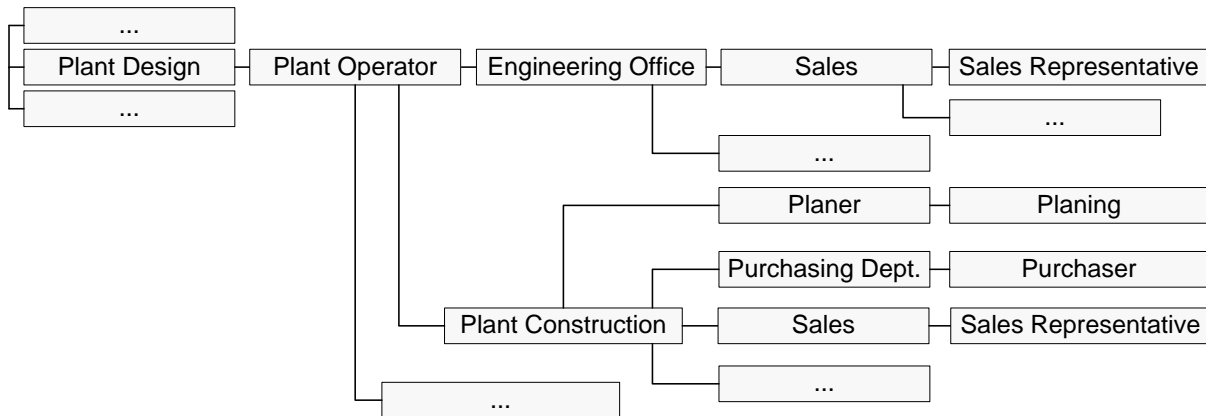


Figure 2. Role hierarchy.

Guidelines and Standards: Different international and national organisations like the *International Organization for Standardisation* (ISO) or the *Deutsches Institut für Normung* (German Institute for Standardisation, DIN) release standards and guidelines for products and services. These often normative documents contain information about legal requirements on how to perform specific activities and the necessary qualifications of employees. In recent years, a variety of different standards in the domain of renewable energies were released, cf. (IRENA, 2013) for an overview about 573 standards. While most of these standards address product-related issues, service related issues are not in the focus of standards as of now. A first approach for classifying technical operation services of renewable energy plants is presented in DIN (2014). Furthermore, Hirschl & Weiß (2009) analyses strategies for renewable energies and can be seen as a preparatory basis for additional standards.

Similar to the company-specific service descriptions (see above), guidelines and standards provide a valuable source for information of required skills, competencies, and qualifications for providing specific services. For example, necessary competencies can be extracted based on description of classified services. In addition, these standards can also serve as a valuable basis for referenced certificates that are legally required for performing specific activities.

Training Materials: Today's economy is characterised by ever-increasing complexity and continuous change. To keep pace with these changes, responsible employees need to participate in advanced vocational training. Several organisations, both public and private, provide different seminars also in the domain of renewable energies. Using the descriptions of these seminars, it is possible to extract relevant skills, competencies, and qualifications. The seminars usually provide an overview about expected outcomes. In addition to this information, it is also possible to scan the seminar descriptions for prerequisites for attending which is also a valuable source.

For the majority of seminars, a certificate is offered for successful participation. Due to this fact, it is possible to establish links between certificates and skills, competencies, and qualifications, i.e. employees that can verify the possession of a specific certificate have the respective competencies. This is of special relevance when structuring the list of skills, competencies, and qualifications as shown in Section 0.

4 Data Structure

As a result of the collection of data about skills, competencies, and qualifications as presented in the last section, an unstructured list was established. However, there is no reasonable way to use this list without any structuring. To overcome this problem, the terms were structured as concepts of an existing ontology. For being able to do so, the following steps were performed and are described in more detail in the next sections:

1. Grouping of obvious synonyms into one concept
2. Extraction of abstract concepts
3. Classification of concepts according to an existing system

4.1 Synonym Identification and Concept Abstraction

Before insights about the synonym identification and concept abstraction are presented, a small prospect about the differences between terms and concepts should be given. A term is a sequence of characters shaping a word of a specific language. A term might have different meanings (i.e. be a homonym), e.g. the term *bank* might refer to a “raised shelf or ridge” or an “establishment which deal in money”⁸. Due to different possible meanings, terms can be used subjectively in different jargons or different companies. Furthermore, different terms might have the same meaning (synonyms), e.g. the terms *quality* and *characteristic* both might refer to a property of an object. The problem of different terms with one meaning is further extended due to different languages, e.g. the English term *quality* has the same meaning as the German term *Qualität*.

Contrary to terms, a concept has exactly one meaning and is, thus, precisely and unambiguously determined. A concept might be defined by using several terms, e.g. translations. Though the philosophical debate about the definition of the concept “concept” is still ongoing (Margolis & Laurence, 1999), this work follows a Platonist approach, defining a concept as an abstract object (Kraut, 2013). Thus, the concept competency represents an abstract competency that might group different concrete instances of this competency. For example, the concrete competencies *readiness for working on construction sites*, *readiness for field installation*, *readiness for travel activity*, and *readiness to travel within Germany* are aggregated into the abstract competency *readiness to travel*.

By extracting abstract concepts from specific terms, obvious synonyms were grouped into one concept, too. For example, the terms *accept responsibility* and *sense of responsibility* were aggregated and the concept *readiness to accept responsibility* was created. In doing so, the list of unstructured terms was cleaned up resulting in a set of unique competency concepts.

4.2 Concept Classification

The terms that were extracted from the different sources were grouped as concepts according to the European Skills, Competencies, Qualifications and Occupations (ESCO) classification systems. ESCO is currently under development by the European Union. A first draft was presented in 2013; the final version is scheduled for 2017⁹. The core of ESCO is established by the three pillars *Occupations*, *Skills and Competencies*, and *Qualifications* that are presented below. To allow for representing dependencies between different pillars, it is possible to establish relations from one concept to another. In doing so, it is, for example, possible to define which competencies are required for or related to a specific occupation.

For interoperability reasons, ESCO is based on semantic technologies RDF (Resource Description Framework), SKOS (Simple Knowledge Organisation System), and LOD (Linked Open Data). Due to these semantic technologies, the ESCO classification can be integrated into company-specific taxonomies more easily. The ESCO data can be imported into a taxonomy management system. In addition, the ESCO portal¹⁰ allows for browsing and searching concepts.

4.2.1 ESCO Pillars

Each of the three ESCO pillars is characterised by a set of hierarchically ordered concepts in a tree-like structure. While leafs of these trees represent actual concepts (occupations, skills/competencies, qualifications), the higher abstraction levels form concept groups. The ESCO data model is presented in Figure 3. As can be seen in this figure, the skills/competencies and the qualifications pillar consist of two levels (the essential skill/competency and qualification and groups of skills/competencies and qualifications). Contrary, the occupation pillar has five levels; the four abstract levels are composed of elements from the International Standard Classification of Occupations (ISCO) enabling the reuse of an existing standard.

⁸ <http://users.tinyonline.co.uk/gswithenbank/homonyms.htm>

⁹ https://ec.europa.eu/esco/escopedia/-/escopedia/ESCO_versions

¹⁰ <https://ec.europa.eu/esco/hierarchybrowser>

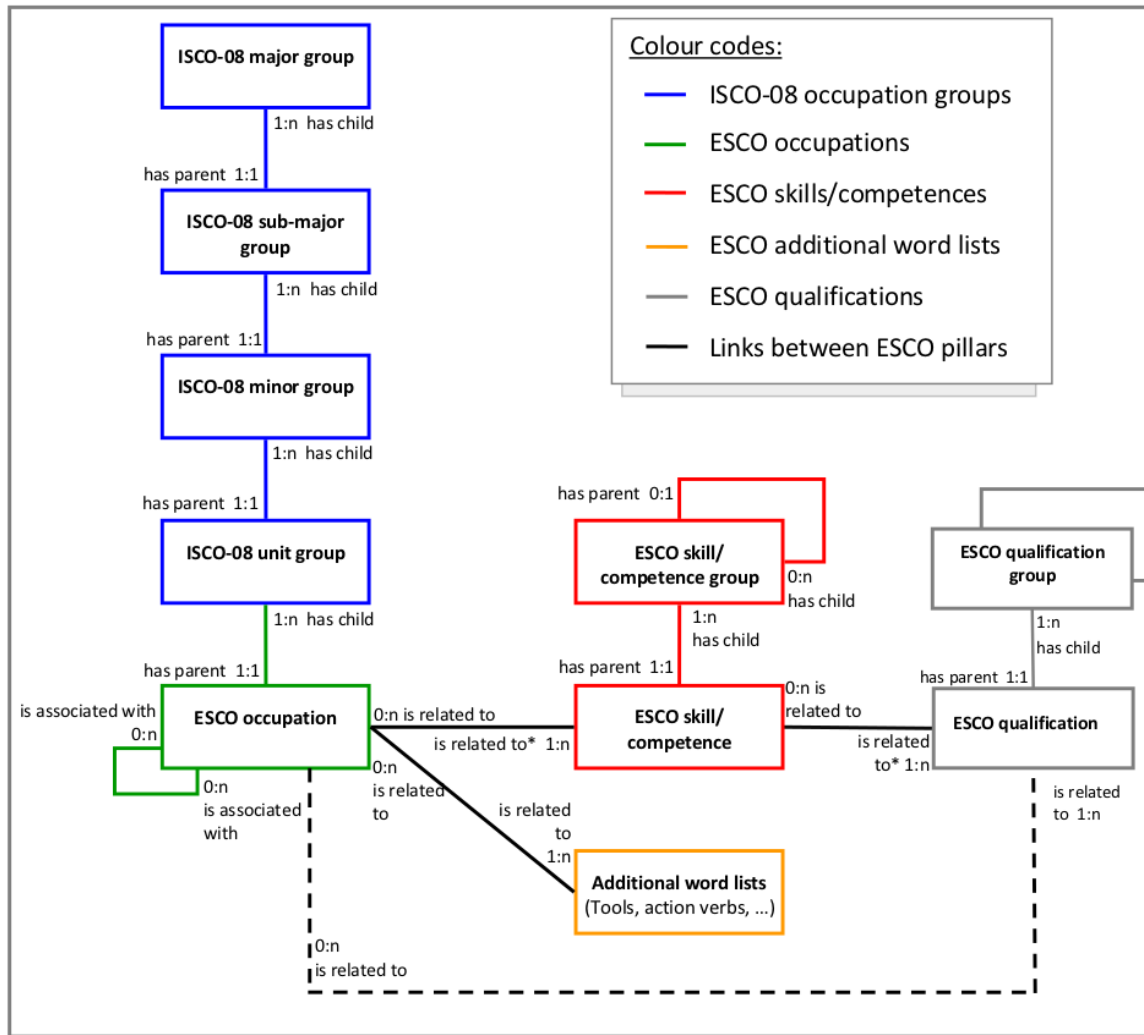


Figure 3. ESCO Data Model¹¹.

An *occupation* according to the ESCO definition is a “grouping of jobs involving similar tasks and which require a similar skills set”¹². Table 2 depicts two examples of ESCO occupations: *Database engineer* and *Business consultant*. For both occupations, a hierarchical structure including the four ISCO layers can be established. In addition to this hierarchical structure, it is possible to define further relations between different occupations and occupation groups, e.g. *Telecommunications Engineer is related to Graduate engineer (electronics/telecommunications)*.

Table 2. Hierarchy of ESCO occupations.

ESCO	Occupation	Database engineer	Business consultant
ISCO	Unit Group	Database designers and administrators	Management and organisation analysts
	Minor Group	Database and network professionals	Administration professionals
	Sub-Major Group	Information and communications technology professionals	Business and administration professionals
	Major Group	Professionals	professionals

As presented in Figure 3, relations between concepts are not limited to the same pillar. Thus, it is also possible to define relevant skills/competencies and qualifications for a specific occupation. For example, the concept *Database engineer* is (amongst others) related to the competencies *Data modelling* and *Data warehouse*. In addition, it is related to the qualification *Cisco Data Centre Application Services Design Specialist*.

ESCO defines *skills* as “the ability to apply knowledge and use know-how to complete tasks and solve problems”¹³. Based on this, a competence is “the proven ability to use knowledge, skills and personal, social and/or methodological

¹¹ https://ec.europa.eu/esco/escopedia/-/escopedia/ESCO_data_model

¹² <https://ec.europa.eu/esco/web/guest/escopedia/-/escopedia/Occupation>

¹³ <https://ec.europa.eu/esco/web/guest/escopedia/-/escopedia/Skill>

abilities, in work or study situations and in professional and personal developments”¹⁴. ESCO contains both skills/competencies for performing a specific occupation as well as cross sectoral skills and competencies. While occupation-specific skills and competencies are structured according to the respective industry domains, the following cross-sectoral skills/competencies groups exist: *Application of knowledge, Attitudes and values at work, Language and communication, Social skills and competencies, Thinking skills and competencies*. Contrary to qualifications (see below), skills and competencies are independent of any formal assessment.

A *qualification* is defined as “the formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards”¹⁵. The ESCO qualifications are structured according to different industry domains. Furthermore, ESCO distinguishes between certification bodies on different levels:

- *National qualifications*, for example the German craftsman are referenced via national databases.
- *Qualifications awarded at national level but regulated at European level* are used to describe harmonised requirements for performing EU-wide activities.
- *(International) qualifications, certificates and licenses linked to tasks and technologies* are usually requirements for being allowed to work in a specific domain, e.g. a forklift license.
- *(International) qualifications and certificates linked to occupations and sectors* are usually requirements for working in a specific occupational area, e.g. aeronautics and rail traffic.

It is possible to define relations between concepts of the qualifications pillar and concepts from the other pillars. The relation can be detailed by different qualifiers (*required for, recommended for, useful for* etc.). For example, the qualification *Airline Transport License* is required for the occupation *Commercial pilot*. To depict the learning outcomes of qualifications, they can be related to skills and competencies. For example the qualification *Project Management Professional* is related to skills/competencies like *project administration, project management, crisis management* etc.

4.2.2 Classification

Since skills and competencies are in the focus of this work the corresponding ESCO pillar was extended. Besides the existing sub-classes *job-specific* and *transversal skills/competencies* and *physical attributes*, the classes *training* and *job-related experiences* were added. Both classes are further divided into sub-classes as presented in the following.

The first sub-class mainly consist of transversal skills and competencies. It is further divided into more specific categories, e.g. leaderships & management and planning & work organisation (cf. Table 3). To complement these categories with additional skills and competencies that are necessary in a specific company setting, they can be extended by referencing existing collections of transversal skills/competencies, e.g. DISCO¹⁶. For increased usability, it is possible to extend DISCO with company-specific skills/competencies. Furthermore, it is possible to hide irrelevant skills/competencies.

Regarding the category physical attributes, the underlying data mainly mentioned the readiness according to specific activities. For example, the readiness to travel is an important physical attribute for working as a field technician.

Table 3. Skills and Competencies for services in the field of renewable energies.

Category	Sub-category	Name
Skills & Competencies	Leadership & Management	Ability to Leadership
		Ability to employee motivation
		Ability to conflict management
		Ability to employee training
		Ability to project management
	Planning & work organization	Endurance
		Ability to work under pressure
		To be proactive
		Self motivation
		Self organization
		Personal responsibility
		Flexibility

¹⁴ <https://ec.europa.eu/esco/web/guest/escopedia/-/escopedia/Competence>

¹⁵ <https://ec.europa.eu/esco/web/guest/escopedia/-/escopedia/Qualification>

¹⁶ http://disco-tools.eu/disco2_portal/

		Conscientiousness
		Motivation
		Neatness
		Planning skills
		Ability to work organization
		Ability to work independently
		Structured way of working
		Systematic way of working

The category *training* is further divided into the sub-classes *formal education*, *vocational training*, and *academic studies*. For renewable energies, vocational training is further divided into training in *technical occupations* and training in *business occupations*. An extract of relevant trainings is depicted in Table 4. As can be seen in Table 4, there are no entries for business occupations training. This is due to the fact that the underlying data did not contain any respective entries.

Though the concepts in the class training might seem very similar to the roles as presented in Table , there is a great difference between the both. Using roles, it is possible to group different activities, e.g. an employee with the role plant designer performs several activities that might require a variety of different competencies. In doing so, a training concept can be used to define a necessary competency for a specific role, e.g. the sales representative might need graduation in renewable energy finance.

Table 4. Trainings for services in the field of renewable energies.

Category	Sub-category	Sub-category	Name
Training	Formal Education		Graduating from „Hauptschule“
			Graduating from „Realschule“
			Graduating from „Gymnasium“
	Vocational Training	Technical Occupations	Training as a Fitter
			Training as an Electrician
			Training as a Mechanic
			Training as a Foreman
			Training as a Technician
			Training as a Mechanical Engineer
			Training as an Industrial Mechanic
			Training as a Mechatronic
			Training as an Electronics Engineer for energy plants
		Business Occupations	n/a
	Academic Studies		Graduated in Mechanical Engineering
			Graduated in Electrical Engineering
			Graduated in computer science
			Graduated in Energy Management
			Graduated in Renewable Energy Finance

The *job-related experiences* are of particular importance for defining requirements regarding the provision of specific services. This category contains skills and competencies that are required for performing certain activities. Job-related experiences are further divided into sub-categories in *experiences in performing activities*, *experiences regarding legal regulations*, and *experiences in using technologies*. Table 5 presents an overview about several examples for providing renewable energies services.

Table 5. Occupational experiences for services in the field of renewable energies.

Category	Sub-category	Name
Job-related Experiences experiences	Functions	Knowledge of welding
		Experience in maintenance
		Experience in error diagnostics
		Competence for controlling wind energy plants
		Competence for controlling photovoltaic plants
		Competence for controlling biomass power plants
	Legal regulations	Knowledge in the use of the “Erneuerbare Energien Gesetz”
		Knowledge in the field of occupational safety
		Knowledge of regulations for the installation of electrical systems
	Use of technology	Experience with measurement technology
		Experience with MRP Software
		Experience with ERP Software
		Experience with diagnostic systems
		Experience with remote service systems
		Experience with monitoring systems

Besides concepts for the skills/competencies pillar, the data also provided several insights about *qualifications* in renewable energies. The qualifications are as presented above (see Sect. 0) divided in the categories *national qualifications*, *national qualifications with European level*, *international qualifications for tasks and technologies*, and *international qualifications for occupations and sectors*. Examples for these qualifications are the driving licence and the switching authorisation as presented in Table 6. Due to the underlying data, there are also national qualifications. However, by evaluating additional sources other relevant qualifications can be added.

Certifications can be issued for products and services as well as for persons and systems. Regarding service provision, the focus is on certifications for persons. These certificates verify that a person has knowledge in a specific area and is allowed to provide certain services. Due to legal regulations, proven certification is sometimes necessary to participate in tendering. In addition, companies can present the certifications of their employees and, thus, distinct themselves from competitors.

Table 6. Qualifications for services in the field of renewable energies.

Category	Sub-category	Name
Qualifications	National qualifications	Driving licence
		Switching authorisation
		GL-Certification
	National qualifications with European level	n/a
	International qualifications for tasks and technologies	n/a
	International qualifications for activities und sectors	n/a

5 Using the Classification

The classification of competencies can be used to associate service process in the domain of renewable energies with required competencies. Since the competencies identified by means of the data collection presented in Sect. 0 cannot cover all aspects of the domain, it is also necessary to enable an extension of the classification. This is achieved by hierarchical structuring of the competencies according to the ESCO system. Using this classification system, company-specific competencies can be easily integrated.

Following the advices on implementing competency management systems as presented by Lindgren, et al. (2004), different aspects of competency management are supported:

- Specification of competency needs: Using the classification, it is possible to denote skills, competencies, and qualifications that are required for performing specific activities as presented in Sect. 0. In addition to enriching company-specific service processes with competencies, it is also possible to establish reference processes for the domain that can be used by different industries. Based on these reference processes, companies can assess which competencies are required for providing specific services.
- Identification of competency gaps: The skills, competencies, and qualifications of the classification can further be used to provide an overview over competencies of different employees. Using this overview and the specification of company needs for different activities, it is possible to identify suitable employees. If no suitable employee can be found for performing a specific activity, this is clearly an indicator for a competency gap. It is either possible to provide advanced training for employees or to hire new employees to fill this gap.
- Competence sourcing & development, project staffing: A clear definition of required competencies can improve job advertisements to the effect that a better matching between applicants and company needs can be established. In addition, advanced studies are described more precisely when using a unified classification of skills, competencies, and qualifications.

5.1 Mapping of skills, competencies, qualifications and services

This section shows the use of skills, competencies and qualifications to simplify the assignment of employees to service processes by means of a use case from practice. The basis for this is the process “Preparation of Troubleshooting” in the field of wind energy, depicted in Figure 4. Starting point of the process is the message of an incident at a wind power plant. This message is triggered either by a plant manager or by a service employee who is on site. The service employee has the task of carrying out the order and documenting the activities.

At first, a suitable service employee will be selected based on the availability and the required know-how by using MRP Software. Then the required spare parts to the execution of the order are planned, by using ERP Software. The service employee analyses the incident on site based on error lists from the manufacturer. For comprehensibility reasons, the process of troubleshooting is embedded in a sub process and not shown here.

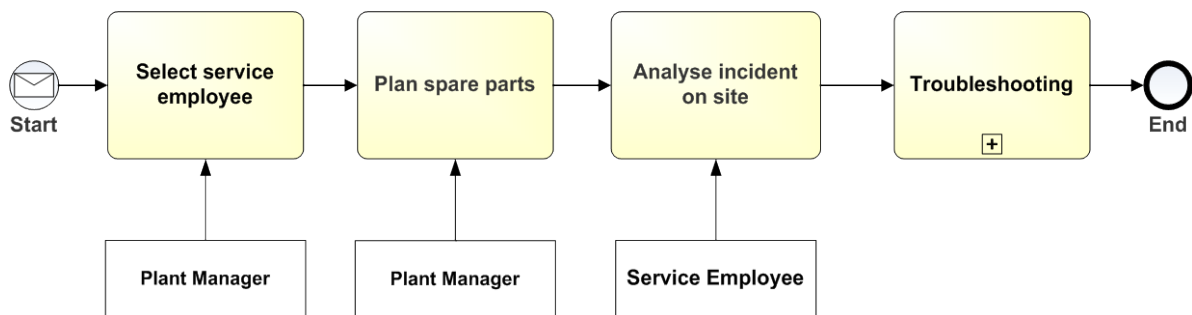


Figure 4. Process Preparation of Troubleshooting with directly assignment of roles.

The allocation of human resources that operate the Activities of the service is currently achieved by direct referencing of roles (sometimes even more explicit persons) (Figure 4). This static assigning impedes a direct reference to the competencies that are necessary to operate the activities. If an employee acquires or loses a skill, competency, or qualification, this information is not linked to the role directly. Therefore the selection of employees is not based on their actual abilities.

To address the mentioned problem, the paper proposes the approach to link activities with necessary skills, competencies, and qualifications. The approach is illustrated in Figure 5. It is shown that the planning of spare parts requires experiences with ERP Software, etc. The classification in this paper can be used as a template to describe skills, competencies, and qualifications in this way. In addition, the selection of competencies can be simplified based on existing classifications such as DISCO. For example in DISCO the competence “Experience with ERP Software” can be referenced by the following levels: interdisciplinary – computer skills – special application software - commercial software – ERP – MRP tool.

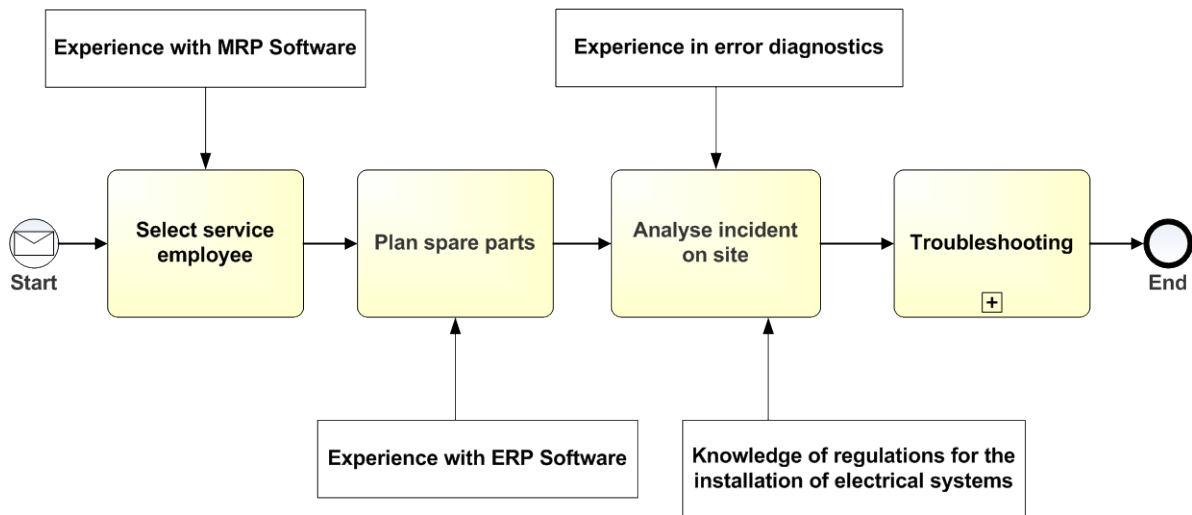


Figure 5. Process with assignment of skills and competencies.

5.2 Mapping of employees and services

The assignment of activities and skills, competencies and qualifications of the process is shown in Table 7 again. The assignment of employees and skills, competencies, and qualifications can be done analogously.

Table 7. Assignment of activities and competencies.

Service	Activity	Experience with/in			Knowledge of
		MRP Software	ERP Software	Error diagnostics	Regulations for the installation of electrical systems
Preparation of troubleshooting	Select service employee	X			
	Plan spare parts		X		
	Analyse incident on site			X	X

Table 8 shows the assignment of employees and skills, competencies, and qualifications, related to the application example. This overview can always be updated with the actual ability of the employee and, thus, it provides an up-to-date basis for taking decisions for assignment to specific service processes.

Table 8. Assignment of employees and competencies.

Employee	Experience with MRP Software	Experience with ERP software	Experience in error diagnostics	Knowledge of regulations for the installation of electrical systems
Employee A	X	X		
Employee B	X			X
Employee C			X	X

Thus, an indirect association between employees and activities can be achieved. The advantage is an improved selection accuracy according to the employee's actual ability. At this point, a resource scheduling for the provision of the service can be done. Table 9 shows the planning related to the application example in which three different employees are required for provision.

Table 9. Assignment of employees and the service “Preparation of Troubleshooting”.

Service	Activity	Employee
Preparation of Troubleshooting	Select service employee	Employee A or B
	Plan spare parts	Employee A
	Analyse incident on site	Employee C

Through the integration of the approach into existing resource planning systems, optimization of resource scheduling can be achieved. In addition, job advertisements can be created more effectively due to the better definition of the field of activity.

By applying the classification in the ESCO system, the various skills, competencies, and qualifications can be stored in a consistent terminology. The opportunity to define relationships between different terms via synonyms is in particular helpful for doing this. These synonyms make it possible to classify external acquired skills, competencies and qualifications in a structured way.

6 Conclusion and Discussion

In this paper, an approach to structure and unify skills, competencies, and qualifications in the field of renewable energies was presented. For this purpose, various sources were analysed and the results were merged in a classification. The classes were classified using the European standard ESCO pillars skills/competencies, qualifications, and occupations. The proposed classification is an initial proposal for the structuring and standardisation in the field of renewable energies. The plausibility and applicability needs to be confirmed in practical use. The usability of the presented classification has already been approved in the context of the conducted workshops with service providers of the industry. It is hoped that in practice there is a broad acceptance of this first comprehensive approach for classification of skills, competencies, and qualifications and that it will be enhanced gradually over time.

Moreover, an approach for an indirect allocation of human resources and service processes was presented. An application example showed how the approach brings a high degree of practicability in practice. The structuring and standardisation supports the selection process of employees and increases effectivity and reliability.

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Les déterminants du succès du mode d'entrée des PME de services industriels "soft" sur les marchés émergents: étude de cas

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Cette réflexion sur les modes d'entrées de PME de services industriels "soft". La prise en compte des facteurs d'internationalisation et le problème de l'établissement des relations d'affaires à deux niveaux - la constitution du réseau et son activation – constitue un sujet critique au sein des PME. Les connaissances théoriques sur le rôle des immigrés dans ce processus sont encore limitées. A partir d'une analyse qualitative exploratoire longitudinale d'étude de cas unique sur la période 2008 à 2013 - combinant la recherche-action et l'observation participante - le sujet traite du choix du mode d'entrée correspondant le mieux aux besoins des PME et leurs performances sur les marchés émergents.

Introduction

Le développement croissant de petites et moyennes entreprises (PME) du secteur de la haute technologie "Born Global" (BG) et qui sont propices à une internationalisation rapide, attire de plus en plus l'attention des chercheurs en stratégie d'internationalisation (Filatotchev et al., 2009 ; Servantie, 2007 ; Varma, 2009). Ce phénomène a déjà été examiné. Les théories déjà proposées incluent: l'approche par les spécificités de ces firmes (Bell ; McNaughton, 2000; McDougall et al., 2003), la stratégie de niche (Atamer, 2012; Rennie, 1993; Rasmussen ; Madsen, 2002; Almor, 2000; McDougall et al., 2003), la forte valeur ajoutée mondiale de leur produit/service (Bell et al., 2003), le rôle de l'équipe dirigeante, son expérience et engagement vers l'international (Persinger et al., 2007; Oviatt ; McDougall, 1994) ; la disposition préalable d'un réseau international (Bell, 1995; Coviello ; McAuley, 1999). Pourtant notre compréhension sur leur développement reste toujours limitée, surtout lorsqu'il se déroule dans des pays émergents (Ngyuen et al., 2013; Bourcieu, 2005).

Les pays émergents manquent souvent de transparence et leurs institutions sont instables. Dans cet environnement incertain et versatile, il devient difficile pour les PME, d'identifier et d'exploiter les opportunités (Nguyen et al., 2013). L'acquisition de connaissances contribue à une mobilité accrue et à une internationalisation plus rapide, ce processus étant façonné par l'équipe dirigeante et la culture organisationnelle de la société (Zahra, 2005). L'entreprise avec différentes orientations culturelles peut repérer et poursuivre différents types d'opportunités (McDougall ; Oviatt, 1994), en particulier dans le contexte des pays émergents, au travers de son capital humain (Batjargal, 2007 ; Goxe ; Viala, 2009 ; Adler ; Kwon, 2002 ; Zhou et al., 2007).

Le capital humain d'une société contribue considérablement à l'établissement de réseaux sociaux. Les études existantes sur les relations construites entre les différentes communautés ethniques évoquent la valeur du multiculturalisme (Peng ; Luo, 2000; Ellis, 2000; Xin ; Pearce, 1996). Les attitudes et un héritage culturel similaires fortifient le réseau de relations entre les membres d'une communauté ethnique en créant des opportunités pour le développement des affaires : accès aux connaissances du marché local et de son système de distribution, accès aux partenaires et associés potentiels ainsi qu'au financement (Yeung, 2004 ; Nkongolo-Bakenda ; Chrysostome, 2013). Ellis et Pecotich (2001, 129-130) ont trouvé l'importance "of prior social ties", ainsi que "awareness of foreign market opportunities" comme les deux antécédents critiques à l'internationalisation. Les prédispositions d'un réseau social sont importantes pour le développement des entreprises dans le contexte des pays émergents : "Such social networks can provide unique information benefits to those who are connected by exclusive or non-redundant personal ties irrespective of whether the nature of the social relations is strong or weak (Burt, 1992,1997)" (Zhou et al., 2007, 676).

Le rôle des réseaux sociaux, du capital humain, comme des facteurs clés du processus d'internationalisation des PME BGs sur les marchés émergents, a fait l'objet de nombreux travaux. Pourtant la recherche sur l'impact du multiculturalisme du capital humain et des liens sociaux de l'équipe managériale pouvant influencer le processus d'internationalisation de l'entreprise n'est encore qu'émergente. Concrètement, l' "interrelation between informal networks and formal modes of international business activity requires further investigation" (Jones et al., 2009, 3). Au sens large, la revue de littérature met en exergue l'attention modeste portée à la recherche sur les modes d'entrée des PME. La performance des PME BGs sur les marchés de pays émergents mériterait également plus d'attention. Brouthers (2013, 9) remarque que la question centrée sur la corrélation entre le choix du mode de présence de la société et son succès est encore sans réponse. Les résultats des recherches actuelles sont contradictoires (Filatotchev et al., 2009). De nouvelles méthodes d'analyse sont à envisager et il est nécessaire d'approfondir ces recherches par des analyses qualitatives longitudinales pour différencier la requête quantitative la plus fréquente afin d'apporter les résultats plus enrichissants (Brouthers ; Hennart, 2007).

Les recherches sur le mode d'entrée sont souvent spécifiées par activité et secteur. Le mode de contrôle varie selon l'activité de la firme (Ekeledo ; Sivakumar, 1998) et les lois du secteur qui peuvent être différentes et propres à chaque pays, voir définies par chacun des états constituant le pays étudié (Porter, 2004). Plusieurs auteurs mettent en évidence

l'importance de distinguer les types de service. La littérature identifie cinquante types de services, "Different service types require varying modes of behaviour in international operations" (Cicic et al. 1999, 93). Les services soft requièrent un fort degré de contact avec les clients. Ils ne peuvent pas être exportés (Erramilli, 1990). Il est très difficile de résoudre les problèmes de mode d'entrée pour les services soft en raison de l'importance des dimensions relationnelles : "In service industries, and especially so in professional services, sales and production of services cannot be kept separate (Gummesson, 1979)" (Sharma ; Johanson, 1987, 22). Cette inséparabilité "has the strongest impact on internationalisation" et, dans le cas de service soft "major adaptation of existing models" est demandée (Cicic et al., 1999, 85, 83).

Ainsi, la présente communication souhaite apporter un éclairage sur la recherche des modes d'entrée de PME BG sur les marchés des pays émergents. Notre recherche s'est portée sur les PME de service industriel soft qui s'internationalisent sur les marchés émergents, ce qui offre une certaine extension aux études précédemment réalisées sur les modes d'entrée au secteur des services industriels (Erramilli, 1991 ; Erramilli ; Rao, 1990 ; Sharma ; Johanson, 1987 ; Sharma, 1989 ; Cicic et al., 1999). Concrètement, dans cette étude nous mettons l'accent sur le rôle et l'impact du multi-culturalisme du capital humain d'une société pour transférer des connaissances et de l'expérience sur le marché d'internationalisation (et non sur la relation entre l'expérience et le mode de contrôle ou d'investissement). Nous considérons que les immigrants participent à réduire l'incertitude, à franchir certaines barrières d'entrée tout en diminuant le coût de transaction et de fonctionnement. Nous étendons les travaux à l'internationalisation de service en suggérant que le choix du marché d'internationalisation et le développement de la PME de service industriel soft dans les marchés émergents ne dépend pas seulement de l'objectif classique prescrit pour les sociétés de service - "client-following" - mais aussi des facteurs spécifiques du capital humain de l'entreprise, de ses réseaux et de ses connaissances pluriculturelles. Ainsi, notre recherche vise à améliorer la compréhension de l'impact des immigrants dans la stratégie d'internationalisation de PME BG et sur ses résultats. Plus particulièrement, nous étudions les effets des transferts de connaissances des immigrants et de leurs réseaux sur le mode d'entrée d'une PME BG sur les marchés des pays émergents, ce qui n'est pas le cas des études précédentes concentrées quant à elles sur le fonctionnement des entreprises multinationales (Jones et al., 2009 ; Zhou et al., 2007). Nous élargissons la vue traditionnelle sur l'internationalisation de service en tant que phénomène étudié sur le PME, et non limité aux seules multinationales.

La Russie est le premier producteur mondial de pétrole brut. L'économie de la Russie est basée sur ses ressources pétrolières et, de ce fait, elle est fortement dépendante du prix du pétrole sur le marché mondial. Pour gérer au mieux cette menace qui pèse sur l'économie russe, un plan de développement appelé "Stratégie Énergétique 2030", a été signé par le Président. L'idée directrice du plan consiste à transférer des technologies des pays développés vers la Russie, ce qui est d'ailleurs une idée commune aux autres pays BRICS. Notre objectif était d'étudier le cas en profondeur, afin d'en tirer une théorie et de la généraliser à d'autres cas similaires.

Notre principal argument théorique est que le mode d'entrée et les résultats d'activité d'une PME de service industriel soft, sur les marchés émergents, dépendent à la fois d'une bonne adaptation de l'offre au contexte du marché d'internationalisation et du capital humain multiculturel de l'entreprise. Pour la recherche en entrepreneuriat international, l'étude sur la contribution des immigrants est d'autant plus importante que plusieurs revues ont montré que les articles récents (Jones et al., 2011 ; Kiss et al., 2012 ; Peiris et al., 2012) n'ont pas pris en considération cet aspect. De plus, comme le remarquent Peng et al. (2008, 920), le processus d'internationalisation sur les marchés émergents nécessite d'être étudié attentivement pour comprendre : "What determines the success and failure of firms around the world ?".

1 Cadre conceptuel adopté

Pour notre recherche, nous nous intéressons au mode d'entrée de service industriel soft. L'intérêt pour la recherche sur l'internationalisation des services est apparu graduellement tout au long des années 90. Comme le précisent Pauwels et Ruyter (2005), les principaux thèmes recensés dans ce domaine sont focalisés sur la phase de pré-"start-up". La littérature fait comprendre que le mode d'entrée est la suite de l'étape préparatoire de la société de service soft. La réussite du processus dépend de la coopération entre les acteurs des réseaux et de la manière d'exploiter ses savoirs et ses compétences. Les réseaux sociaux peuvent jouer un rôle essentiel dans la collecte et la synthèse des informations (Borch et Huse, 1993). La plupart des décisions économiques sont assez complexes et il est nécessaire de collecter des informations provenant de multiples sources officielles, tel que les consultants, avocats et banquiers. Dans une PME, cela est surtout la prérogative de l'équipe dirigeante (Marchesnay, 1997). Un entrepreneur cherchant à développer son entreprise, doit donc s'enquérir régulièrement de la disponibilité des ressources humaines et des modes de financement, de la présence de concurrents potentiels, etc.

La littérature scientifique, notamment Wiedersheim-Paul et al. (1978), Erramilli (1990), Patterson et Cicic (1995), Ekeledo et Sivakumar (1998), distingue deux types de services: "hard" et "soft". Les services hard ont un faible degré de contact avec les clients (Patterson and Cicic, 1995) comme dans le cas de compagnies aériennes, de banques, d'éditeurs de logiciels et autres supports médiatiques, etc. Les chercheurs (Terpstra et Yu, 1988 ; Weinstein, 1977 ; Ekeledo et Sivakumar, 1998) remarquent que le mode d'entrée du secteur de service hard ne présente pas de différence significative avec celui du secteur manufacturier, tandis que le secteur de service soft présente une problématique à part.

Les services soft (tel que le consulting et autres services professionnels) impliquent un fort degré de contact avec les clients. Il est donc difficile de séparer les consommateurs du processus de production. Les caractéristiques des services

soft sont: l'intangibilité, la périssabilité, l'inséparabilité et l'hétérogénéité (Ekeledo et Sivakumar, 1998, 278). A cause de l'importance de la dimension relationnelle, les problèmes de mode d'entrée pour les services soft sont compliqués à résoudre. Un rapprochement physique, par l'implantation, d'une compagnie réalisant des prestations intellectuelles, est justifié par le degré de participation de ses clients au déroulement des prestations (Philippe et al., 2009, 24). Selon Ekeledo et Sivakumar (1998), les services soft ont quatre modes d'entrée: filiale totalement détenue, co-entreprise en capital, franchise ou accord de collaboration.

1.1 Les modalités d'internationalisation des services soft

L'accompagnement de la clientèle existante à l'international est le facteur prépondérant sur le choix de mode d'entrée des services soft (Erramilli et Rao, 1993). Les auteurs se focalisent sur le choix binomial entre différents modes de contrôle : complet et partiel, les éléments de stratégie globale et de motivation ayant une importance égale. Erramilli (1991) développait le concept « U-shape » de relation entre l'expérience et le mode de contrôle ou d'investissement. Selon lui, l'entreprise de service soft choisit la forme juridique de la filiale dès le début. Avec l'expérience, elle change sa forme de présence en faveur de co-entreprise en capital avec mode de contrôle partagé. Ensuite, une fois l'expérience internationale acquise, elle retourne vers une forme de filiale. Ekeledo et Sivakumar (1998) expliquent cette logique d'action par le facteur « client-following » : au début, en rentrant sous l'ombre du client, l'entreprise prend un positionnement de « niche » sur le marché et crée une filiale. Puis, à force de trouver un meilleur équilibre par rapport aux régulateurs du marché local, elle crée une co-entreprise en capital avec la société locale. Plus tard, maîtrisant la gestion des risques du pays d'accueil, l'entreprise étrangère reprend une forme de filiale, avec mode de contrôle complet.

Majkgård et Sharma (1999), après avoir analysé 362 sociétés internationales de services, arrivent à identifier les facteurs auxquels les services soft sont soumis dans le contexte de leur choix du mode d'entrée sur le marché étranger. Les facteurs à influence faible: le prix de service soft; la concurrence entre les firmes locales sur le marché domestique ; la concurrence entre les firmes étrangères sur le marché international ; le fait d'être établi localement sur le marché étranger. Les facteurs à influence forte : les connaissances et les compétences de l'entreprise; la filiale aide à construire, et à maintenir, un réseau de contacts plus large que dans le cas d'un partenariat de collaboration; la construction d'une base de confiance avec le client; la forme de filiale détenue est préférée par les investisseurs étrangers; les accords de coopération à l'étranger sont perçus comme des facteurs importants pour la compétitivité de l'entreprise.

Monnoyer et Philippe (1991) notent que la stratégie des services aux entreprises, y compris le service soft, repose sur « les compétences, la flexibilité et les relations en face à face (proximité géographique) » (Monnoyer et Philippe, 1991, cité par Nagy, 2006 :306). La technologie est un facteur déterminant dans l'internationalisation des services (Léo et Philippe, 2006). En conséquence, le pays de l'innovation bénéficie d'un monopole jusqu'à ce que les autres pays apprennent à produire ou à imiter cette marchandise. En attendant, ceux-ci doivent importer. C'est ce qu'on appelle la théorie de « technological gap » (Posner, 1961). La différence de progrès technologique entre les pays, surtout la possession des hautes technologies dans divers domaines industriels par des pays développés, a créé le besoin de commercialisation de la technologie au-delà des frontières nationales. Elle exige d'être accompagnée par les activités tertiaires y compris les services soft – tel que le consulting et l'assistance technique.

1.2 Le mode d'entrée de service soft et les réseaux

Les études empiriques de Coviello et McAuley (1999) de l'internationalisation des PME producteurs de logiciels, montrent que les relations à l'intérieur des réseaux influencent le choix de marché ainsi que le mode de présence sur le marché étranger, dans le contexte des relations en réseau en cours.

La recherche d'Axelsson et Johanson (1992) montre que le mode d'entrée doit aussi être perçu comme « position-building process », le processus par lequel la position d'une firme est renforcée par l'effet de réseaux (cité par Johanson et Vahlne, 2009 :1415). Leur étude a révélé la complexité associée à l'apprentissage lorsque l'entreprise rentre sur un marché étranger car les liens entre les acteurs sont souvent invisibles. Ceci ne peut être identifié que dans le processus d'internationalisation et les actions en cours. Cet obstacle d'« outsidership » est un manque d'information sur les barrières à l'entrée (barrières institutionnelles de l'Etat du pays d'accueil, linguistiques, culturelles, coutumes et traditions, etc.). L'impasse pour accéder à ces connaissances indispensables provient de la déficience dans la construction du « trusted middleman run » (Johanson; Vahlne, 2009, 1417). L'entreprise qui reçoit les informations de son réseau peut franchir les barrières d'entrée et, ainsi, assurer sa performance. Yeung (2004) a étudié la collaboration entre les entreprises de Singapour et de Hong Kong : les liaisons interculturelles créent une menace en limitant le développement entre des cultures sociales différentes. D'où l'intérêt d'établir des relations professionnelles avec des représentants possédant une double culture, tel que les étrangers (acheteurs-importateur) du pays d'origine de la société (vendeurs-exportateurs).

L'implication d'immigrés originaires du pays du marché ciblé présente un autre avantage. En effet, le service soft, comme par exemple le service de consulting ou de gestion de projet, exige un niveau évolué d'échanges oraux. Cette particularité de service soft consiste en des connaissances tacites (« Tacit Knowledge ») qui sont similaires à l'intuition (Polanyi, 1966). Elles sont apprises et accumulées à travers les expériences (Munier, 1999). Ces connaissances tacites sont difficilement codifiables pendant le processus d'internationalisation. Cette particularité augmente l'implication des

ressources humaines dans la production des services, malgré les barrières de la langue du pays d'accueil. A cet égard, Cyr (2006, 5) souligne « Dans ce contexte, la connaissance de la langue du pays facilitera grandement le processus d'internationalisation » ainsi que la perception des connaissances par le client car « la quantité et la qualité des informations que le questionneur peut obtenir ne seront manifestement pas les mêmes selon qu'il puisse ou pas communiquer dans la langue du pays. » L'auteur mentionne les responsables de la société dans le processus d'internationalisation des PME et l'interprétation adéquate de leurs expériences. De nombreux chercheurs s'accordent sur le fait que les personnes les mieux placées pour se renseigner et comprendre la situation réelle du marché sont les acteurs du terrain choisis. Ce sont ces agents multiculturels (Ellis et Pecotich, 2001 ; Yeung, 2004), avec leurs réseaux, qui peuvent collecter les informations stratégiques de terrain.

Les canaux d'information formels et informels contiennent beaucoup plus d'actualité du pays que l'information diffusée à l'export. On peut considérer que l'impact langagier est d'autant plus justifié que l'un des objectifs des services soft est le transfert, voir le partage, des connaissances avec les clients. Par ailleurs, cela impacte la qualité et la satisfaction perçues par le client. Dans le contexte du marché émergent, Nagy (2006 :307) souligne l'importance des canaux d'information « informels », car les TIC y sont limitées.

L'analyse du cadre théorique adopté nous fait conclure que, avant toute réflexion concernant la forme de présence sur le marché du pays étranger, l'entreprise est soumise à une étape préparatoire importante de pré-internationalisation. Celle-ci repose sur les décisions des responsables, l'environnement de l'entreprise, son développement dans le marché global et le processus d'acquisition des connaissances et d'information. Ces stimuli influencent la volonté d'exploiter les marchés étrangers. Pendant cette étape, la société accumule les atouts – elle implique notamment ses employés immigrés – et travaille ses réseaux dans le but d'accélérer le processus d'internationalisation.

2 Méthodologie

L'approche qualitative approfondie sur la recherche du mode d'entrée semble très demandée (Brouthers ; Hennart, 2007). Cela résulte du fait que chaque cas est unique et justifie une étude par pays. L'étude de cas a été reconnue comme une approche d'étude sur l'influence du réseau spécifique à l'internationalisation des BG (Sharma ; Blomstermo, 2003 ; Falize ; Coeurderoy, 2012 ; Coviello, 2006). Cette approche est « very suitable for international business/international entrepreneurship research (Sinkovics et al., 2008 ; Welch et al., 2011) » (Vissak ; Zhang, 2009, 250). Elle a aussi été largement utilisée pour les recherches sur le mode d'entrée des services soft, notamment pour le consulting technique (Sharma, 1989 ; Sharma ; Johanson, 1987 ; Cicic et al., 1999) et l'influence des immigrés dans le développement de sociétés à l'international, sur les marchés émergents (Vissak ; Zhang, 2014 ; Aliaga-Is ; Rialp, 2013).

Il n'y a pas de nombre idéal de cas dans cette approche méthodologique (Vissa ; Zhang, 2014 ; Yin, 2009). Notre recherche se cantonne à l'étude d'un seul cas bien défini dans le temps et dans l'espace – un cas unique. Bien que cette méthode - avec une légère capacité de validation externe - soit moins généralisable que la méthode quantitative (Voss et al., 2002), nous l'avons privilégiée grâce à son retour sur les résultats plus enrichissants et profonds (Yin, 2009) demandés dans les recherches de mode d'entrée (Brouthers ; Hennart, 2007). Il s'agit d'un cas unique - un phénomène non rare mais sur lequel on a encore très peu de connaissance (Yin, 2009 ; De Ville 2000), qui se déroule dans un environnement complexe et instable (Wacheux, 1996) – la caractéristique principale des marchés des pays en transition. L'approche quantitative est apparue comme impraticable dans notre contexte: les spécificités du secteur d'activité et la culture du pays n'ont pas permis d'effectuer les démarches d'analyse à l'aide d'interviews. Pour accéder aux acteurs des pays en transition et ainsi assurer la fiabilité des données, l'immersion au sein d'une entreprise et la participation à la stratégie d'internationalisation nous a semblé la solution la plus évidente pour notre recherche: « La qualité des données en bénéficie » (Hlady Rispal, 2002).

Cette étude de cas s'est faite grâce à une Convention Industrielle de Formation par la Recherche (CIFRE) qui a permis un encadrement spécifique. La présente recherche a aussi bénéficié d'un financement et de la collaboration d'un partenaire socio-économique (PSE) – une société d'assistance technique et de consulting en ingénierie. Ainsi, l'auteur a bénéficié d'une relation de proximité avec l'entreprise de septembre 2008 à janvier 2013. A partir d'une analyse qualitative exploratoire longitudinale, nous avons pu examiner le rôle des employés étrangers sur le mode d'entrée des PME des services industriels «soft» et les résultats obtenus sur les marchés émergents.

Deux méthodologies ont été successivement mises en place chez le PSE : recherche-action et recherche-observation. Dans un premier temps, de septembre 2008 à juin 2009, l'information initiale était collectée à partir de revues de: articles de presse, études historiques et documentaires - pour reconstituer une partie de la chronologie -, analyse des rapports officiels concernant la libéralisation du marché oligopolistique du pays émergent - pour bien comprendre les tenants et aboutissants de la législation du secteur pétrolier. Pendant cette période, nous avons procédé à des allers-retours entre théorie et terrain en gardant le statut de « chercheur-ingénieur », tout en étant à la fois animateur et évaluateur. Ce double statut rend possible la création de connaissances scientifiques par la conceptualisation et la construction de l'outil de recherche (Chanal et al., 1997). La méthode des cas est destinée à analyser une situation réelle « in vivo » par l'ordonnateur d'une entreprise afin d'initier une décision managériale (Wacheux, 1996). « La recherche intervention ne peut exister que s'il existe une volonté d'apporter des changements à la situation initiale, en collaboration avec les acteurs de l'entreprise, et accompagnée d'un dispositif permettant de produire de la connaissance scientifique » (Zawadski, 2011, 11). C'est le cas de notre recherche puisque nous avons accompagné la PME de service industriel soft dans sa stratégie d'internationalisation sur un marché émergent afin d'en identifier le mode d'entrée. Pour

l'approche terrain, la recherche évolue au cours de l'immersion dans l'organisation (Hlady-Rispal, 2002 ; Yin, 2009). Dans un second temps, de juin 2009 à décembre 2013, nous avons procédé à l'observation participante afin de mieux comprendre et analyser le mode de fonctionnement du PSE. Lors cette étape, nous avons collecté et analysé des compte-rendus de réunions, de missions, de téléconférences, etc. effectués dans le cadre de l'accompagnement du PSE sur le terrain. Afin de rester neutre durant la phase d'intervention, nous avons préféré l'instrument d'investigation par récits de missions pour avoir l'avis d'un maximum de parties pertinentes et une vision la plus globale possible. L'étude de cas nous a permis d'accumuler les données et de généraliser les résultats de deux visées de recherche: visée transformative de recherche-action et la visée compréhensive et explicative par l'observation participante. Le travail de narration analytique qui a permis de valider nos propositions de recherche résulte de la mise en application de ces démarches.

En choisissant l'étude de cas unique comme approche, le chercheur doit être conscient du risque de mettre "tous ses œufs dans le même panier". Suivant les recommandations de Yin (2009), quatre éléments ont été respectés dans notre recherche afin d'en garantir le caractère scientifique, la qualité, la fiabilité, la validité et la robustesse des résultats: authenticité du cas - nécessité de décrire une situation réelle de la vie professionnelle ; urgence de la situation dans le cas - nécessité de s'assurer de l'actualité ou bien nécessité de diagnostiquer le problème ; orientation pédagogique du cas - nécessité d'effectuer une formation dans le domaine particulier traité par le cas ; finitude du cas - nécessité de présenter une situation globale.

Pour respecter les critères discriminants mentionnés ci-dessus, des séjours prolongés ont été effectués sur le terrain de la recherche (en Russie), au sein de la compagnie du PSE, cela afin de comprendre les particularités de l'activité, de la culture et du langage. Ces démarches ont été exigées par le problème perçu et évoqué au sein du PSE. Nous avons terminé notre recherche en 2013 par la phase "d'arrachement" du terrain qui a permis le recul nécessaire et suffisant sur le sujet pour avancer des idées novatrices puisque "la justification d'une recherche sur un terrain unique n'est en effet pas de valider des concepts déjà connus (un cas de plus n'est pas probant pour "vérifier" une théorie), mais d'en proposer de nouveaux" (Berry, 1999, 5).

3 Etude de cas

Le contexte de la recherche est particulier à double titre : elle se déroule en Russie dont l'économie est en transition du collectivisme étatique au libéralisme et elle concerne une PME du type BG de services industriel soft, opérant dans des secteurs oligopolistiques: les secteurs pétrolier et parapétrolier.

D'après l'évaluation de la COFACE pour l'Union Européenne, les opportunités du marché russe sont grandes. En 2006, l'exportation française vers la Russie a progressé de 42% par rapport à l'année précédente. En 2010, affectée par la crise en 2009, elle a progressé de 30% et en 2011, de 15%. Par contre, le climat des affaires reste préoccupant à cause de la corruption, du système institutionnel faible, des droits de propriété (les institutions régionales et fédérales ne sont pas forcément d'accord sur les règles à appliquer) et de l'efficacité du gouvernement. La Russie manque de technologie et de capitaux pour exploiter ses gisements. Elle a besoin de travailler avec des entreprises occidentales et d'adopter - partiellement - leurs cultures opérationnelles.

La conduite de projets pétroliers à l'international est complexe. Il existe une multitude d'acteurs et de services. Il est nécessaire de comprendre la structure du marché visé ainsi que les interactions entre les acteurs. La communication est complexe. Notre rôle, dans l'organisation, a été de faciliter le développement et la performance du PSE sur le marché russe en servant de support à la communication entre les acteurs du terrain (les partenaires et clients potentiels) afin de bâtir la stratégie d'internationalisation du PSE. Cette place a semblé profitable car elle permettait d'accumuler, de façon légitime, des observations utiles. En effet, cela a facilité l'accès au processus d'élaboration de la tactique et stratégie de l'entreprise par l'équipe dirigeante.

3.1 Présentation du PSE

Le PSE est spécialisé dans l'assistance technique et la formation professionnelle auprès de grandes entreprises industrielles des secteurs pétrolier et parapétrolier. La société a été créée en avril 2000, en France, par cinq ingénieurs issus du secteur et ayant fait partie d'une équipe d'experts d'une des « supermajors » du secteur. Cette équipe avait pour rôle d'évaluer le personnel technique de supervision, de développer et réaliser un plan de formation et d'assistance technique pour la Division Forage d'une compagnie algérienne à Hassi Messaoud. Plus de 350 superviseurs et ingénieurs ont été formés (3 ans de formation par personne). Une fois le projet terminé, les experts se sont associés pour valoriser leurs compétences et savoir-faire et proposer ce type de service à d'autres entreprises du secteur pétrolier. Le DG a contribué majoritairement au développement du PSE en prenant à sa charge l'assurance crédit qui servit à créer la société, les locaux du siège social ainsi que la gestion administrative. Les autres associés, quant à eux, se sont limités à apporter leurs connaissances, leurs expériences ainsi que leurs réseaux de contacts. Le PSE a remporté, en 2009, pour sa stratégie et sa croissance à l'international, le Trophée de l'Export lors du Forum International Class Export co-organisé par la Chambre de Commerce et d'Industrie Marseille Provence (CCIMP). Le PSE a établi des partenariats dans 37 pays. L'activité principale du PSE est l'assistance technique. Ceci implique répondre à des appels d'offres et placer du personnel spécialisé en CDD (de 6 à 24 mois) ou CDI dans les compagnies importantes du secteur. Le PSE gère les contrats et les salaires du personnel placé et facture ses clients mensuellement. A ce jour, le PSE compte 42 employés à

travers le monde, dont 14 employés de bureaux et 28 spécialistes (en poste chez des clients). La formation du personnel est aussi commercialisée. Les formations sont souvent modifiées selon les besoins des clients. Une fois les contrats obtenus, des supports sont préparés par des experts externes (possédant généralement 20 à 30 ans de métier sur le sujet à enseigner ainsi qu'une expérience reconnue en tant qu'instructeur en centres de formation ou chez des compagnies importantes du secteur). Le noyau dur de l'effectif est constitué d'une vingtaine d'experts qui sont systématiquement sollicités par le PSE. Ce sont les « Knowledge Angels » auxquels se réfèrent Muller et al. (2012). Le volume de contrats et de jours de formations vendus varie d'une année sur l'autre.

La majorité des affaires (85%) est amenée par l'équipe dirigeante. Le premier contact se passe directement entre le client et les associés-dirigeants du PSE. Il permet de définir les besoins du client sur le terrain et d'y répondre adéquatement. Le reste des affaires résulte de l'activité de prospection des commerciaux et des réseaux de connaissances personnelles de ces derniers en lien avec le marché ciblé. La société est présente dans de nombreuses régions (Europe, Moyen et Extrême Orient, Afrique du Nord et du Nord, Amérique du Nord, etc.) au travers de représentants, de succursales ou d'unité commerciale complètement intégrée à la maison-mère.

3.2 Immersion

De mai à août 2006, l'auteur a effectué un stage au sein du PSE. Pendant ce stage, l'auteur a analysé ses pratiques d'implantation au Moyen-Orient, en Roumanie, en Italie et au Portugal. Il a été observé que la volonté d'implantation était en partie liée au contexte du marché ciblé et que la difficulté principale consistait à détecter le bon mode d'entrée pour chaque pays et les spécificités de service de l'industrie choisie (investissements, équipements, matériels, etc.) tout en prenant en compte le fait que, dans une PME, le problème d'investissement survient en premier lieu. Pour minimiser le coût de transaction et de fonctionnement à l'international, le dirigeant a toujours choisi une personne en fonction de ses connaissances personnelles, de ses compétences linguistiques et, si possible, ayant la nationalité du pays considéré. Les représentants du PSE à l'international sont ainsi tous imprégnés de la culture locale, et maîtrisent la langue du marché ciblé.

Connaissant l'origine et la maîtrise des langues russe et anglaise de l'auteur, le DG du PSE lui proposa un stage ayant pour mission principale l'identification de possible sponsoring et/ou partenariat avec des sociétés actives dans les secteurs pétrolier et parapétrolier, l'objectif étant la représentation des services du PSE, et de ses partenaires, en Russie et en Europe de l'Est.

A la fin du stage, le DG proposa à l'auteur de représenter la société en Europe de l'Est et en Russie ainsi que d'assurer la prospection dans le secteur pétrolier. Désireux de poursuivre ses études scientifiques, l'auteur déclina l'offre d'embauche.

Fin 2007, plus d'un an après son stage, l'auteur a finalement rejoint le PSE en tant que responsable développement pour la Russie. L'intervention au siège social du PSE débuta en septembre 2008. L'objectif était, dans un premier temps, de trouver un sponsor faisant office de représentant local puis, en fonction du volume d'affaires dégagé, de proposer à ce même représentant d'ouvrir une filiale pour le PSE.

3.3 Déroulement du projet et résultats

En ligne avec les objectifs du PSE, nous avons procédé à l'application de la recherche-action pour analyser ses deux activités principales sur le marché russe et définir les axes stratégiques d'évolution interne et externe. Nous avons ensuite défini les actions à entreprendre pour donner un essor au développement des affaires en Russie à court et moyen termes et le pérenniser sur le long terme. Pour réaliser ce diagnostic, nous avons utilisé différentes sources d'information: (1) des rapports commerciaux en lien avec la démarche d'internationalisation du PSE, les bilans de la société et autres documents permettant de mieux comprendre les avantages concurrentiels du PSE sur d'autres marchés instables, notamment en Afrique du Nord et au Moyen-Orient; (2) des compte-rendus de conversations avec les associés du PSE et autres salariés, représentants commerciaux, associés, collaborateurs et clients de la société, ainsi qu'avec des prospects rencontrés lors d'un salon professionnel à Moscou; (3) des publications analytiques: avis d'experts dans des articles de presse industrielle, des cours théoriques universitaires russes sur l'économie du secteur pétrolier, des articles généralistes sur l'économie russe parus dans la presse russe et étrangère; (4) des études du secteur pétrolier en Russie, y compris sur les besoins en assistance technique et en formation professionnelle: RBK (un groupe de média russe faisant partie de l'indice RTS), Xerfi700, Douglas-Westwood, données de Rosstat (Service fédéral russe de statistiques); (5) une étude de la législation relative aux investissements étrangers dans le domaine des hydrocarbures: actes juridiques du Code Civil de la Fédération de Russie, Code Fiscal de la Fédération de Russie, Code de la Fédération de Russie sur les Délits Administratifs; (6) l'expertise de Mme M. en législation, finance et taxation sur le marché russe; (7) les résultats du benchmarking réalisé pendant la création du site Internet de la société; (8) divers articles correspondant au sujet de recherche, des cahiers industriels, des études de marchés, etc.

L'ensemble de ces informations a été assimilé par le DG qui a conceptualisé la stratégie d'entrée sur ce marché à fort potentiel d'opportunités et de croissance. En effet, la Russie est le deuxième exportateur mondial de pétrole. Mais le PSE n'avait jamais travaillé avec des entreprises russes et n'y était pas connu. De plus, le PSE n'avait jamais employé ou placé de personnes russes. Pour éviter, autant que possible, tout problème d'ordre financier, juridique ou comptable, le DG privilégia d'abord une stratégie de développement à travers une compagnie sponsor, c.à.d. une société active dans

le secteur ciblé et susceptible de présenter les services du PSE (et de ses partenaires) en Europe de l'Est. Idéalement, cette société devait avoir fait ses preuves, être bien implantée au niveau régional, offrir un (ou des) services complémentaires et être de taille équivalente (les compagnies de taille supérieure pouvant, selon le DG, menacer l'individualité et l'image du PSE). Afin de sceller ce partenariat, le PSE proposait une réciprocité de représentation de services dans les régions où il est déjà présent.

Il est important de noter que l'établissement d'un partenariat fiable revêt un caractère particulièrement stratégique pour une société de service « soft ». En effet, ce type de collaboration implique un transfert de connaissances et compétences, fruits d'expériences acquises chèrement sur le terrain. Il faut donc être très vigilant quant au choix du partenaire. Finalement, cette méthode est apparue comme trop risquée et fut, de ce fait, abandonnée par le DG. Une autre stratégie d'implantation considérée par le DG consistait à identifier les clients fidèles du PSE opérant déjà sur le territoire russe. Hors, il est apparu que les gérants et actionnaires locaux conservent une grande autonomie décisionnelle. Il a donc été nécessaire, pour le PSE, d'établir de nouveaux contacts et de maintenir le dialogue avec les « anciens – nouveaux » clients. Aidé des commerciaux du PSE, l'auteur a effectué plusieurs recherches. Les commerciaux ont sollicité leurs nombreux contacts pour connaître les projets en Russie pour lesquels le PSE était susceptible de les accompagner. Un seul projet a été décelé. Celui-ci consistait à accompagner le client dans son développement en fournissant l'assistance technique. Pour faciliter la collaboration et réaliser cette prestation de service, le DG - qui avait déjà été confronté à une telle pratique au cours d'étapes précédentes d'internationalisation de l'entreprise - a décidé de s'implanter sur le marché.

Le temps est un facteur critique du secteur d'activité du PSE. Les projets ont souvent des durées de vie courtes et les délais de réponse requis, par le client, pour les appels d'offres, sont souvent d'une à deux semaines maximum. Une implantation directe sur le marché permet à la fois un allègement du travail administratif et une acceptation plus rapide des réponses aux appels d'offres. Trois formes d'implantation ont été proposées par l'expert mandaté par le PSE: un bureau de représentation, une succursale et une filiale. La solution initialement retenue fut l'ouverture du bureau de représentation. La lenteur administrative (liée aux modalités d'enregistrement des sociétés étrangères auprès d'un organisme spécial situé dans la capitale du pays) puis les restrictions imposées au niveau commercial par ce type de structure ont incité le DG à considérer la "filiale". Celle-ci est plus avantageuse au niveau fiscal et juridique mais elle implique la présence d'une personne physique sur le territoire alors que, à cette période, aucune personne digne de la confiance du DG n'était en mesure d'engager les démarches nécessaires.

Finalement, l'ouverture de la succursale est apparue comme le mode d'entrée le mieux adapté. Il a été décidé que l'auteur s'occuperait de l'ouverture de la succursale dans sa ville natale, Novosibirsk, troisième ville de Russie. Celle-ci est devenue effective en juin 2009. Des prestations d'assistance de direction et de secrétariat ont été intégrées au contrat avec l'agence consulting de Mme M., ce qui a permis au PSE de minimiser les frais. Enfin, la fonction de l'auteur a évolué pour prendre la direction de la succursale russe.

L'enregistrement de la nouvelle structure effectué, tous les supports (site internet, édition du cours, catalogue, brochure, triptyque, etc.) ont été traduits en russe pour satisfaire les exigences des décideurs locaux: « la langue officielle de notre pays est le russe. Nous vous demandons de nous envoyer le descriptif du cours en russe. » insista M. K. – responsable formation d'une grande société pétrolière russe. Ce travail de traduction a été réalisé par l'auteur et Mme E., camarade de promotion, rentrée chez le PSE à mi-temps, en tant qu'assistante pour des travaux de correction de textes techniques. Mme E. est docteur en mathématiques et avait 5 ans d'expérience en tant que commerciale en Russie. En juin 2009, Mme E. devint attachée commerciale, à mi-temps, pour la Russie et les pays de la Communauté des États Indépendants (CEI). Cette collaboration avec Mme E. permis à l'auteur, dès juin 2009, de procéder à l'approche d'observation participante pour la recherche. Les principaux supports d'analyse pour cette étape étaient les comptes-rendus de travail et un journal de recherche - rapports d'opérations commerciales hebdomadaires. Ce dernier a été constitué à partir de rapports détaillés de missions, préparés par les membres de l'équipe mobilisée pour l'analyse du terrain et pilotée par l'auteur.

Dans le même mois, une mission à un salon professionnel en Russie a été effectuée par l'auteur, Mme E. et l'un des associés du PSE. Plusieurs contacts ont été pris et un contrat a été signé pour une prestation de perfectionnement du personnel d'une société pétrolière russe sur un logiciel de forage. Le projet s'est inscrit dans une niche où aucun concurrent était présent. Le PSE était « la seule société capable d'offrir cette formation spécifique » commente le responsable formation de la société pétrolière russe, M. S. Pour effectuer cette formation, le PSE a constitué un groupe du travail franco-russe. A travers ces sessions de formation, l'auteur a appris à aborder et gérer les interactions techniques et culturelles d'un groupe de travail constitué d'italiens, d'algériens, de français et de russes. Ce projet fut une réussite, la collaboration entre experts issus de la zone méditerranéenne et des universitaires russes ayant donné pleine satisfaction au client.

Ce premier client a ensuite délégué, au PSE, l'évaluation de certains de ses collaborateurs. Dans le cadre de ce projet, le PSE a pu pousser plus loin la démarche initialement adoptée en se faisant accompagné par les services de plusieurs universités russes. Ce projet a été accepté par le client comme un projet de la formation obligatoire.

Ces projets-pilotes ont fait ressortir des facteurs non observables, liés en grande partie à la spécificité du client, à celle du PSE ainsi qu'à l'espace et au temps réels. Ces facteurs ont été détectés au gré des conversations et des multiples réunions avec les responsables formation du client. Il s'agit de procédures internes relatives à la prise de décision concernant le profil des prestataires. Ces règles internes au client existent pour protéger ses objectifs à long terme, la formation étant considérée comme un investissement sur du personnel qui sera mobilisés sur des projets clés à venir. La

proposition commerciale du PSE a alors été adaptée aux nuances de fonctionnement du client découvertes par l'équipe de front-office du PSE (l'auteur, l'attachée commerciale russe et les ingénieurs experts russes et européens en forage). Les experts du PSE ont développé et animé les cours, accompagnés par l'auteur et Mme E. Ils ont aussi profité de cette opportunité pour évoquer d'autres problèmes opérationnels et techniques avec le client et l'aider à définir ses besoins. Ainsi, l'équipe du PSE est répartie de chez le client avec deux contrats supplémentaires.

Un second projet de développement a été initié en 2010, dans le cadre de l'année de croisement culturel France – Russie. Un partenariat a été établi avec les cinq universités du Pétrole & Gaz les plus prestigieuses de Russie. Au travers de ce partenariat, le PSE a tenté d'apporter des méthodes et un savoir-faire en terme de formation aux compagnies pétrolières majeures, celles-ci étant déjà clients des universités. La valeur ajoutée du PSE ne se limite pas à l'apport de compétences et de connaissances théoriques. Le PSE a une grande expérience opérationnelle de terrain, à l'international. Hors, c'est précisément cette expérience de terrain qui fait défaut aux universités russes. Le catalogue de prestations du PSE a été intégré aux sites internet des universités. Il attire beaucoup d'attention de la clientèle des universités. Enfin, cet intérêt marqué engendre la nécessité de renforcer les compétences linguistiques du PSE afin d'assurer le bon déroulement des projets de formation, les supports devant obligatoirement être fournis en russe.

Fin 2010, l'auteur présentait au DG une étudiante ukrainienne en commerce international (pour trouver cette candidate, l'auteur avait contacté son ancien responsable de faculté) Celle-ci accepta un CDI un an après, en tant qu'assistante export pour la Russie et CEI.

Les efforts de commercialisation d'assistance technique (2ème activité du PSE) n'ont pas produit les résultats escomptés malgré les adaptations du produit de base en fonction des circonstances du marché ciblé. En effet, les clients potentiels objectaient typiquement que : « Une équipe de forage russe comprend 9 personnes et coûte 4500 roubles par jour (env. 120 euros). C'est deux fois moins cher que le tarif d'un de vos spécialistes de base! ». Les retours étaient du même acabit concernant l'offre du PSE pour la fourniture de matériel de forage innovant car la main d'oeuvre des prospects et ceux-ci sont satisfaits du travail accompli. Par conséquent, l'offre du PSE en terme de consulting technique (conseil, audit, ingénierie, formation et expertise) en forage est la plus adaptée au marché ciblé.

4 Discussion et les implications managériales

La littérature consultée a mis en évidence l'importance du rôle des employés immigrants, de leurs connaissances du marché, leurs liens utiles, leur expérience dans le développement international de PME de type BG (Filatotchev et al., 2009 ; Vissak ; Zhang, 2014 ; Nguyen et al., 2013 ; Zhou et al., 2007). Les auteurs remarquent que, dans le contexte de pays émergents avec des systèmes institutionnels faibles, les relations informelles jouent un rôle significatif sur ces marchés souvent caractérisés par une instabilité, des turbulences, un manque de transparence, etc.

Dans le cas présent, l'implantation d'une PME BG de service industriel soft, les trois immigrants slaves - parmi 14 employés - ont influencé son développement à l'international. Par le moyen d'activation du réseau (McDougall et al., 2003 ; Johanson; Vahlne, 2009), le directeur de la PME étudiée a pu trouvé des sources d'information fiables devenues stratégiquement importantes lors de la prise de la décision (Hrebiniak; Joyce, 1985) du mode de présence sur le marché ciblé. Pour ce faire, le directeur a identifié et sélectionné la personne la mieux placée pour se renseigner et comprendre la situation réelle du marché – l'acteur de terrain privilégié est un agent multiculturel (Ellis; Pecotich, 2001 ; Yeung, 2004). Par conséquent, la distance « psychique » et « physique » se trouve raccourcie grâce à l'expérience et au réseau de l'agent (McDougall et al., 2003 ; Johanson; Vahlne, 2009 ; Sousa ; Bradley, 2006).

La stratégie initiale d'entrée de cette PME BG était « strategic resource seeking » (Dunning, 1998): elle consistait à rentrer sur le marché par le biais d'un partenariat avec une société identique en taille et proposant un service supplémentaire ou complémentaire au sien. Cependant, la barrière de la confiance est apparue comme insurmontable. En effet, les relations créées sont souvent basées sur l'honneur, la bonne exécution du travail à accomplir, la coopération dans les zones de conflits (et à risque), etc. Les bonnes références se répandent moins rapidement que les mauvaises. Une mauvaise expérience avec un prestataire peut se répandre dans le milieu via les forums et les réseaux de connaissances, avec pour conséquence la perte d'une partie voire de tout un marché. Ne pouvant contrôler ce risque, le dirigeant s'est ensuite orienté vers un autre concept d'entrée : « client-following » (Erramilli ; Rao 1990). La complexité de la bureaucratie administrative du système d'Etat russe s'est avérée très handicapante pour la PME étudiée. Le projet a pu être abouti grâce au réseau (Johanson ; Vahlne, 2009) de l'employée immigrante. Pour pénétrer un marché convoité dans un pays émergent, l'avis d'un expert juridique et financier du marché ciblé est indispensable. Le décideur, l'employée immigrée et l'expert mandaté se sont concertés à maintes reprises durant la phase de pré-rentree. Durant cette étape préparatoire, il a été possible de développer et améliorer les ressources et capacités de l'entreprise (internes ou externes) (Wiedersheim-Paul et al., 1978). Des séances de « brainstorming » ont permis d'aboutir à un accord quant à la meilleure forme de présence pour le service industriel soft sur le marché ciblé, s'assurant ainsi que celle-ci se concrétiserait non seulement par rapport aux projets de la PME (Léo ; Philippe, 2001) mais aussi par rapport aux ressources dont l'employée immigrée disposait ainsi que la possibilité d'en assurer le mode de fonctionnement sur le nouveau marché. La forme de présence sur le marché est un choix partagé entre le dirigeant d'une PME BG et l'employée immigrante qui s'engagea à diriger la nouvelle structure locale tout en minimisant son coût de fonctionnement. Dans le cas étudié, le positionnement géographique sur le marché de la PME de service industriel soft a une importance moyenne. L'employée immigrée accède aux clients potentiels sur les salons professionnels - la communication en russe est propice au développement de relations d'affaires favorables et favorise la création d'un

espace de confiance (Yeung, 2004). Le premier contrat obtenu fut le fruit du travail accompli, en grande partie, par les employées immigrées qui, au gré des rencontres avec le client, ont su percevoir les nuances de propos de leurs interlocuteurs et faire en sorte que l'offre soit adaptée pour les satisfaire au mieux. L'impact de ces facteurs non observables sur le succès d'une entreprise est développé dans plusieurs études scientifiques de l'école « autrichienne ». Nous supportons la réflexion de Jacobson (1992) qui débattait des questions telles que : l'innovation continue, la flexibilité, ainsi que les influences non observables de la performance des entreprises.

Dans notre étude, nous avons constaté le rôle important des immigrés dans le développement de la PME BG en service industriel soft mais aussi celui des experts. Lorsque le client est prêt à dialoguer sur les modalités du contrat, le processus de concrétisation de l'offre de service démarre. Il s'agit d'une étape qui implique la participation d'experts ou Knowledge Angels (Miller et al., 2013). Ce sont eux qui sont en contact direct avec les responsables formations du client pour créer l'offre finale. Ces « Knowledge Angels » sont aussi impliqués dans le processus de vente (en étant face aux équipes d'experts du client) et ensuite, en étant face aux stagiaires, dans les salles de cours. Enfin, durant ces prestations de services soft, les experts peuvent mettre en lumière d'autres opportunités de formation qui amèneront l'entreprise à signer d'autres contrats.

Le cadre conceptuel proposé permet de faire plusieurs préconisations pour réussir l'implantation d'une PME de type BG de service industriel soft : (1) être conscient du rôle important du capital humain multiculturel ; (2) adapter l'offre de service au marché ciblé ; (3) impliquer des experts originaires du pays ciblé ; (4) traduire tous les documents et supports dans la langue du pays ciblé ; (5) un avis expert sur la législation fiscale du marché ciblé est obligatoire sur les marchés volatils ; (6) les experts de l'entreprise n'ont pas qu'un rôle technique mais ils sont aussi de véritables agents commerciaux pour la réussite du projet.

5 Conclusion : les limites et les perspectives

Les retombées de nombreuses études montrent la nature fragmentaire des recherches sur le mode d'entrée des entreprises de services, en particulier pour obtenir des données provenant de sources empiriques sur la gestion stratégique du processus d'internationalisation, ainsi que son adaptation et son développement, dans le contexte des pays d'économie en transition (Kennedy, 2005 :119). La discussion de cette section est donc nécessairement généralisée dans le but de fournir des lignes directrices pour les recherches futures. Les limites de la recherche dans le cadre conceptuel sont bien définies par l'encadrement choisi, par le temps et l'espace (une seule industrie, une seule entreprise), dans le cadre méthodologique : l'étude de cas unique.

Les perspectives envisagées consistent à étudier la nature du réseau (personnel ou professionnel) du dirigeant d'une PME de serviceS « soft » et comment il intervient dans sa réussite à l'international. La recherche pourrait être étendue à une autre PME de services « soft » ou à l'implantation dans un autre pays émergent.

Les résultats obtenus montrent que les PME de service « soft » se développent à l'international en s'appuyant sur leur capital humain, précisément des immigrés provenant des pays émergents ciblés pour l'exploitation, sur leurs réseaux en tant qu'outil d'accès à une information fiable dans un environnement volatil, sur la différenciation de l'offre et sur la réactivité pour exploiter une stratégie de niche. La nature des services « soft » n'est pas immédiatement compréhensible, ce qui, pour convaincre les clients, nécessite d'exploiter les capacités rhétoriques du personnel en contact, de faire attention à l'image projetée et de gérer les relations et les interactions avec les clients. De plus, nos résultats font apparaître l'importance de l'étape préparatoire pour la réussite du projet d'implantation dans ce contexte. Le décideur, l'employée immigré, l'expert juridique et financier, tous se réunissent dans l'étape de pré-entrée. Suite à l'activation du réseau, la prospection de la société sur le marché ciblé commence. La société accède aux clients en développant les relations d'affaires et en découvrant les facteurs non-observables.

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Societal, Territorial and Welfare dimensions of Economic Intelligence in a Services Based Economy in France

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In France, the Economic (EI) or Competitive Intelligence (CI) has gradually emerged as an important tool for strategic decision in business with some delay regarding other countries. Appeared in an industrial economy, it has gradually integrated the dimensions of services' economy, and so the digital dimension and that of social networks. Having clarified our methodological positioning, we will discuss the changing context in which EI develops with the transition from an industrial economy to a service-oriented economy in a global competition for business companies, but also for States and local communities. We then will present different approaches to "French" EI before proposing a synthesis approach, with particular emphasis on strategic, territorial and societal dimensions.

En France, l'Intelligence Economique (IE) s'est progressivement affirmée comme un outil important pour la décision stratégique en entreprise, avec un certain retard par rapport à d'autres pays. Apparue dans une économie industrielle, elle a progressivement intégré les dimensions de l'économie des services, ainsi que la dimension numérique et des réseaux sociaux. Après avoir précisé notre positionnement méthodologique, nous évoquerons le contexte en pleine évolution dans lequel elle se développe avec le passage d'une économie industrielle à une économie centrée sur les services, dans une concurrence mondialisée concernant les entreprises, mais aussi les Etats et les collectivités locales. Nous présenterons ensuite les différentes approches de l'IE « à la française » avant d'en proposer une approche de synthèse, insistant sur les dimensions stratégiques, territoriales et sociétales de l'IE.

1 Introduction

With the globalization of the economy and its corollary of generalized competition, not only between companies but also between States and local authorities, the issue of Economic (EI) or Competitive Intelligence (CI) has become essential. It gradually became important to the detriment of inquiry or intelligence (*renseignement*) with always sulphurous connotation linked with military or secret services. These profound changes in the global context of the EI applications have both given it a new legitimacy and a much broader area of action for not only for companies but also for States and Local Authorities.

We now encounter different and complementary approaches to Economic and Competitive Intelligence. Firstly a micro approach regarding Enterprises (EEI) or EI as an aid to strategic decision that corresponds to the first approaches of EI in France as technological watching, close enough to Anglo-Saxon approaches of Business or Competitive Intelligence. There is now a more global approach (macro), more social and territorial (attractiveness) of EI corresponding to a new approach by the government in France (Revel, 2012) after more Business and Companies origins (Martre¹⁷'s report in 1994, Carayon¹⁸'s reports in 2003 and A. Juillet's action¹⁹). These developments represent another aspect of global context of changes in which issues of Economic Intelligence development take place: a shift from focusing on industrial prospect (goods and products driven) to a Services Driven Economy (Du Tertre) economy. If the EEI remains important, other more comprehensive and holistic approaches have emerged: TEI (Territorial Economic Intelligence) and SEI (Strategic Economic Intelligence).

Having clarified our methodological positioning, we will discuss the changing context in which EI develops with the passage of an economy driven by industry to a services driven economy. We then present different approaches to "French" EI prospects: EEI, TEI or SEI, before proposing a synthesis approach, with particular emphasis on Territorial, Societal and Welfare dimensions of EI.

¹⁷ Henri Martre is a French [telecommunications engineer](#). He headed both the French [Délégation Générale pour l'Armement](#) (DGA) the aerospace conglomerate [Aérospatiale](#) and the [French Aerospace Industries Association](#) (GIFAS). He is considered one of the main promoters in France of "[competitive intelligence](#)", being with P. Clerc president of a commission which produced a report important for the beginnings of Economic Intelligence in France.

¹⁸ Lawyer, Member of Parliament (MP) for Tarn's department until 2012, Bernard Carayon has been in the French Parliament particularly invested in issues of Economic Intelligence and Economic Patriotism. He was president of the Commission which produced the 2003 report on Economic Intelligence.

¹⁹ After responsibilities within various companies (Ricard ...), Alain Juillet has been heavily involved in the French intelligence services. He was manager for Top Competitive Intelligence in France depending of the Prime Minister Offices (2003-2009).

2 Methodological aspects

Our analysis is based on participation in seminars, symposia and workshops, interviews with key actors in the EI (Economic Intelligence) or TI (Territorial Intelligence) field, with the integration in networks of experts and researchers.

A literature review is constantly updated (see references). It is articulated in a field dimension acquired by PhDs or masters works. We are in a critical posture focused on information and communication sciences (ICS) in a perspective of research – action. This paper constitutes a more theoretical part of our works.

We try to adopt the position of "committed neutrality" proposed by N. Heinich with a view to build knowledge for action with the complementarity of informational and communicational approaches also in relation with management projects.

The more comprehensive approach to Business, Economic or Competitive Intelligence we offer includes new approaches to Quality and Evaluation as an Organizational and Situational Intelligence, relying on the notion of "sustainable information". Data quality is essential. In the context of an intangible economy, "sustainable information", assuming both "more sharing, fairness, innovation and responsibility", also implies sharing and appropriate conservation strategies (Bourret; Cacialy; Chambaud, 2008).

It is at our level, trying to participate to the project of Edgar Morin, relaying Blaise Pascal to "work to well thinking" ("*travailler à bien penser*") (Morin, 2013, 61) to "think differently" (Morin, 1999) and in particular to think globally complexity and change. In this perspective, EI has both, in every organization, internal dimensions (exchanges and collaborative dynamics) and external dimensions (control of the competitive environment) both with an informational dimension: obtaining and getting the right information to the right person at the right time to make the best decision and also communicational dimension: lobbying, influence externally, but also foster cooperation both internally and also with customers and suppliers.

The dramatic development of ICT, with the addition of new tools and Internet technologies, including Web 2.0 and Social Networking, has also contributed significantly to the evolution of Competitive Intelligence.

The issues of Open and Big Data and that of the development of Social Networks both in their external aspects (new marketing process, visibility on the Web, e-reputation) and in their internal aspects (collaborative organization) is to take into account, the open data primarily concerning public organizations and private companies being concerned by big data

In France, the CNIL (*Commission Nationale Informatique et Libertés*) organized a seminar about the issue of Open Data on July 2013. Participants stressed the idea that the open data is primarily a tool for modernizing public action and of general interest for Democracy which needs the best opacity and privacy for citizens and transparency for the State, when it is often the opposite that happens. Open Data is an essential component of transparency. Personal data is not *a priori* the first concerned by Open Data. Open Data have no personal nature, they concern mainly State (or linked organizations such as Health Insurance Offices) or Local Authorities data (maps, raw data, general indicators).

But we have entered a period of "Revolution of the Data." "Putting the world in data" lead us to redefine the way we act, and to create knowledge infrastructure of a new kind. The boundaries between the different categories of data, personal or public, anonymous or indirectly identifiable are not always clear.

3 From a Product and Industrial Approach to a Services Based Economy Approach

In its beginnings, EI or CI has grown in an industrial approach especially using technology watching tools and industrial property with the strong importance of analyzing the patents taken out by the companies (Dou, 1995).

In France, Economic or Competitive Intelligence is often considered as a relatively new concept appeared in 1994 with the Martre's report and developed after the Carayon's report (2003) and the action of A. Juillet (2003–2009) in the Prime Minister offices.

It also exists another approach: EI or CI was also a main goal for the companies since a long time as "Organizational Intelligence" (Wilensky, 1967). Then CI meets the concepts of Quality and Evaluation. Wilensky stressed the importance of information. He warned that "the competent organization of the intelligence function cannot substitute for political and administrative leadership judgement" (Wilensky 1967, xi). He emphasizes that "the danger of technicism is in direct proportion to the shortage of educated men ... social science is to be incorporated into decision making" (Wilensky, 1967, 190).

The changes have been very significant since thirty years as outlined by G. Gramaccia (2008). Three iconic innovations that have become symbolic of managerial efficiency, have profoundly changed the thinking and practice of cooperation in organizations: the Total Quality Management (importance of recognition), the Project Management (autonomy and subsidiarity) and the Knowledge Management with the pragmatic of digital link with aspects of "cognitive capitalism" in the global context of a "networked society" (Castells, 2001).

Wolton (2014) highlighted the fashion effects of vocabulary ("obsessive words"). "For ten years, we spoke of "information highways" and of "information society", then it was the obsession of the "networked society", now the fashion is about "all digital" and to the "extended man."

EI integrates all these evolutions. While Martre's report (1994) stressed the importance of information and favored Competitive Intelligence applied to enterprises, ten years later (2003), Carayon's report proposed to articulate business competitiveness and social cohesion.

The challenge now is to adapt the concepts and methods of Competitive Intelligence to a service-based economy (Du Tertre) also incorporating societal and welfare approaches or from the so-called "Goods Dominant Logic" (GDL) to a Services Dominant Logic "(SDL). This notion of services has expanded to include customers and suppliers and also within the organization in relation to the logic of value creation at all different levels and the definition of cost centers and profit centers. Everyone now produces data within the company or organization with in relation the difficulty of storing all this data and with a typically problematic of EI, the challenge of analyzing to give the relevant information faster and discovering weak signals.

This production of huge amounts of data is linked with the obsession of quantitative and measurable management, denounced by both V. de Gaulejac (*La société malade de la gestion*, 2005) and H. Mintzberg "*Remarque sur un bien vilain mot : efficience*" (2001, 479-485), and so by E. Morin (2013) speaking of "*barbarie bureaucratique*" or "instrumental reason" has replaced "real rationality" or C. Revel²⁰ (2012), pointing after others drifts in quality approaches and, more specifically, in the evaluation actions.

In a context dominated by the urgency, the issues of meaning and cooperation have become central with those of recognition at work and confidence, particularly in its digital dimension. New approaches to EI in a services, intangible and digital society must take into account all these elements.

4 What Positioning for Economic Intelligence: Entreprise Economic Intelligence (EEI), Territorial Economic Intelligence (TEI) or Strategic Economic Intelligence (SEI)?

4.1 Entreprise Economic Intelligence (EEI)

As we already mentioned, the Martre's report on *Intelligence Economique et stratégie des entreprises* (committee co-chaired by P. Clerc²¹ involving also P. Baumard and C. Harbulot) established in France twenty years ago (1994) a basic and fundamental reflection and an official recognition of Economic Intelligence, moving away from the intelligence (inquiry), with more military and police backgrounds.

The definition of EI given in this report translates this initial positioning corresponding to Entreprise Economic Intelligence (in French : *Intelligence Economique d'Entreprise*).

"Economic Intelligence can be defined as the set of coordinates research, treatment and distribution, for its operation, useful information for economic actors. These different actions are carried out legally with all the guarantees of protection necessary to preserve the assets of the company in the best conditions of quality, time and cost. Useful information is that is needed by the different levels of decision of the company or the community, to develop and implement consistently the strategy and tactics necessary to achieve the goals set by the company to improve its position in its competitive environment. These actions within the company, are organized around a continuous cycle generator of a shared vision of the goals of the company." ²²

The aspects of decision support and risk analysis are essential.

In the field of EI, Entreprise Economic Intelligence is a specific community. It held its workshop on the campus of the Ecole Polytechnique (Palaiseau) in December 2013 on the theme: "*L'Intelligence Economique d'Entreprise face au défi du numérique*."

In his preface to the book of D. Rouach, R. Salmon²³ extended the EI prospects (1999). He highlighted the "pitfalls of EI" : information overload, technical specialization (already denounced by Wilensky in 1967) which divides the activities, which prevents dialogue and any overall vision, increased uncertainty and instability in the environment.

²⁰ Former student of the *Ecole Nationale d'Administration* (ENA), Claude Revel career's is since 1989 dedicated to Business Intelligence. Associate Professor at Skema Business School (Nice-Lille) responsible for EI in companies and president of a consulting firm in EI, she has become Delegate Interministerial for Economic Intelligence (DIIE) in May 2013.

²¹ Philippe Clerc is since 1997 Director of Economic Intelligence, Innovation and Information Technology in the French Assembly of Chambers of Commerce and Industry. He is also Chairman of the AFDIE (French Association for the Development of Competitive Intelligence).

Particular acknowledgements to him for our very interesting discussion during the Economic Intelligence symposium in Ajaccio in december 2013

²² In French in the Martre's report : « *L'intelligence économique peut être définie comme l'ensemble des actions coordonnées de recherche, de traitement et de distribution, en vue de son exploitation, de l'information utile aux acteurs économiques. Ces diverses actions sont menées légalement avec toutes les garanties de protection nécessaires à la préservation du patrimoine de l'entreprise, dans les meilleures conditions de qualité, de délais et de coûts. L'information utile est celle dont ont besoin les différents niveaux de décision de l'entreprise ou de la collectivité, pour élaborer et mettre en œuvre de façon cohérente la stratégie et les tactiques nécessaires à l'atteinte des objectifs définis par l'entreprise dans le but d'améliorer sa position dans son environnement concurrentiel. Ces actions, au sein de l'entreprise, s'ordonnent autour d'un cycle ininterrompu, générateur d'une vision partagée des objectifs de l'entreprise.* »

²³ Robert Salmon was Vice Chairman of L'Oréal in charge of General Direction of Prospective.

In the first approach, the EEI owed much to Technological Watching and especially on technical exploitation of patents. R. Salmon highlights the risk of a "vision of the industrialist watch" (Rouach, 4). He was one of the first to be attentive to overview new forms of competition such as benchmarking.

But, for him, these two facets of EI are insufficient. "Because they are based only on a rational and formalized methodology, Technological Watch and Competitive Watch *stricto sensu* withdraw by definition a whole field, the social, cultural and moral aspects, that only a finer approach to information allows to penetrate, which is at work in the Societal Watch".²⁴ It will take years to EI to develop these prospects outlined by R. Salmon.

D. Rouach offers a definition of EI with which we agree: "Business Intelligence is a new way of thinking to interpret the information to act, and a mode of action to share information for the benefit of the performance. It finally permits going from adaptation to anticipation and give leaders no longer possible scenarios, but decoding and mental patterns to better manage uncertainty and complexity. It is also a body of principles, often of common sense, that can not underestimate the competitor and adopt some form of intellectual humility "(1999, 16–17)²⁵.

In the extension of Carayon's report (2003), the definition of EI proposed by A. Juillet (2006) reflects the broadening of perspectives and gives the outlines of a "French EI" with a national strategic dimension: "The Economic Intelligence consists of the control and protection of strategic information to any economic actor. Its triple purposes are the competitiveness of the industrial framework, security of the economy and of companies and strengthening the influence of our country."²⁶

This EEI met Social Networks and Web 2.0. If the processes and jobs around Economic Intelligence evolved with the passage from an industry driven economy to a services driven economy with the importance of immaterial stakes, it has also been heavily jostled by the emergence of new ICT tools (data mining ...) and social networks, both externally and internally. These changes correspond to a 2.0 company where the flow of information decompartmentalizes jobs. Externally, organizations develop strategies presence on social networks: visibility, new forms of marketing and customer relations: social network, e-reputation, new ways to innovate and create (open innovation and crowdsourcing) ... (Balagué; Fayon, 2011). Internally, there is the dynamics of social networks as a collaborative process that fundamentally changes the positioning and the practices of Economic Intelligence.

All these changes justify for M. Perrett²⁷ (2013) the importance of "Social Intelligence." In the EEI perspective, for him, "Social Intelligence is the New Frontier for Business Intelligence." This is the "Frontier" with the meaning of the Far West in the United States in the mid-nineteenth century: pioneering spirit, conquest of new territories to develop ... For him, "The ever expanding use of social media and mobile technologies has dramatically changed how we communicate and how we interact with the companies that sell to us. As channels of communication expand to include social media networks, blogs, forums and chat rooms, digital and physical lives are intersecting more than ever. What people do online provides an increasingly accurate picture of their customer profile, including lifestyle choices, buying preferences and brand perception."

This approach opens new fields in EEI, especially with neurosciences but also raises ethical issues on the use of Big Data and the privacy of citizens (personal and sensitive data).

4.2 Economic Intelligence and Territorial Intelligence

EI in its broader approach necessarily met territories that not concerned in an important manner EEI in its first formulation.

Territorial Intelligence is a special field of research with its networks and its positioning. According to JJ Girardot²⁸: "Territorial intelligence is the science having for object the sustainable development of territories and having for subject the territorial community." This approach meets some aspects of Economic Intelligence but is above all dedicated to the "territorial community", with a key role of inhabitants, associations and Local Authorities".

Also Economic Intelligence and Territorial Intelligence have – but in a different vision about the priority given to the actors - a systemic approach in focusing on interactions between actors.

After a strong investment on industrial property and technological watching in its origins, French EI was heavily involved in cooperative networks (clusters or competitiveness poles: in French *pôles de compétitivité*, cf. H. Dou).

²⁴ In French in the text: « *Parce qu'elles reposent uniquement sur une méthodologie rationnelle et formalisée, la veille technologique et la veille concurrentielle stricto sensu évacuent par définition tout un champ, l'ordre social, culturel et moral, que seule une approche plus fine de l'information permet de pénétrer, celle qui est à l'oeuvre dans la veille sociétale.* »

²⁵ In French: « *L'intelligence économique est un nouveau mode de pensée permettant d'interpréter l'information pour agir, et un mode d'action pour partager l'information au profit de la performance. Elle permet enfin de passer de l'adaptation à l'anticipation, et de donner aux dirigeants non plus des scénarios possibles, mais des décodages et des schémas mentaux pour mieux gérer l'incertitude et la complexité. Elle est aussi un corps de principes, souvent de bon sens, qui permettent de ne pas sous-estimer l'adversaire et d'adopter une certaine forme d'humilité intellectuelle.* »

²⁶ In French: « *L'Intelligence Economique consiste en la maîtrise et la protection de l'information stratégique pour tout acteur économique. Elle a pour triple finalité la compétitivité du tissu industriel, la sécurité de l'économie et des entreprises et le renforcement de l'influence de notre pays.* »

²⁷ Mark Perrett is Worldwide Social Intelligence Solution Development Leader for HP Enterprise.

²⁸ JJ Girardot, Ricerca e Sviluppo-Res per the politique socialization, 1-2/2009. ISSN: 1970-9080 <http://www.territorial-intelligence.eu/portail/site/>

The cluster concept has been proposed by M. Porter in 1998. It is often compared with the model of the Italian districts. But while the Italian districts specialized in a particular product (sneakers Montebelluna), the cluster covers a wide area of activities, such as health and is involved in all the steps of the value chain: R & D, training ... Porter (1998) gave the following definition: "A cluster is a geographic concentration of interconnected companies as suppliers of goods and services in closed industrial branches; firms delivering the final product cooperate with universities and with their competitors ". A district is mostly composed of very small family companies, while a cluster hosts small, medium and large companies²⁹.

France has preferred the notion of "competitiveness pole" or in French "*pôles de compétitivité*", defined as "clusters serving business and job growth." They are a partnership between private (enterprises) and public organizations, based around a theme and a specific region often on a technological field (ex electric car in Saclay) or environmental or digital projects (smart city). The "*pôles de compétitivité*" correspond to a specific labellisation by the French State. Another associative projects not subsidized directly by the State take the name of "clusters". So in Ile-de France (Paris Region) it exists a "Cluster Tourism Paris Val d'Europe" located in Marne-la-Vallée area (Disney and University Paris East Marne-la-Vallée).

A "*pôle de compétitivité*" try to bring together large and small firms, Research organizations and Educational establishments, all working together on a specific Region to develop synergies and cooperative efforts around a shared theme.

The goal of "*pôles de compétitivité*" is "to build on synergies and collaborative innovation projects in order to give partner firms the opportunity to become the first in their markets, both in France and abroad"³⁰

The first specificity of the "Cluster Tourisme Paris Val d'Europe" in Ile-de-France Region to point out is that it concerns a very important services sector in France: Tourism. It is based on 3 different levels: enterprises, teaching, and research. It wants to play the role of catalyst and facilitator of projects on the whole Ile-de-France Region and not only on the Marne-la-Vallée area.

The international attractiveness of Val d'Europe sector, its hotels' capacity (the fifth in France after Paris, Lourdes, Nice and Lyon) and its exceptional accessibility (TGV ...) are the major advantages of Marne-la-Vallée for the development of a new cluster of excellence dedicated to leisure, sports and big events.

As a result of agreements signed between the State and the Euro Disney (first in 1987 and recently extended to 2030) this site is going to double its capacity to welcome and hospitality attractions within a high densification of tourism activities (business tourism, green tourism, sustainable tourism such as *Village Nature* project).

This cluster also bets on the development of a sector of higher education and research dedicated to business tourism, hospitality, leisure with strong interactions between private companies and public agencies. In addition to the university sector, with one or two research laboratories, it will include public or private schools and different degrees from the BTS degrees, Professional Licences (Bachelors), Master and PhD with, for example, a school that will train managers and executives of large groups hotel on the model of the Lausanne's school³¹.

4.3 Territorial Economic Intelligence (TEI)

Economic Intelligence gave birth to another particular approach: Territorial Economic Intelligence (in French : *Intelligence Economique Territoriale*), notably proposed by the French prefect Rémy Pautrat to organize a system that makes sense in a coherent policy to promote growth and employment, linking industrial policies, territories development policies and economic development actions, often most separated at both central and local levels, with a clear lack of coherence and coordination.³²

This Territorial Economic Intelligence can be defined as valuation, coordination and protection of economic assets, industrial and technological know-how on territories and their SMEs networks to transform them into decisive comparative advantages in a now globalized competition.

This approach of TEI wants to propose a unified and coordinated system, with the key role of "*pôles de compétitivité*" to promote regional development. It involves the creation of networks of experts and policy makers, inter-companies and inter-administrative organisations and Local Authorities, but also between government, business companies, universities, schools and the different actors of local economic and social development. It also has a "militant" and training role, according to its founders, essential to help building sustainable competitiveness of French companies.

Note that the Chambers of Commerce and Industry practice activities they describe as "Territorial Watching". In fact, it rather corresponds to activities of Economic Intelligence on a specific territorial area.

The role of government and public powers is crucial. So in November 2013, the Prefecture of Region of Ile-de-France, in partnership with the Interministerial Delegation for Economic Intelligence (C. Revel), held its annual conference on the theme of "*L'Intelligence Economique au service de la recherche et de l'innovation*".

²⁹ Available on: <http://cybergeog.revues.org/4961>

³⁰ Available on : <http://competitivite.gouv.fr/les-brochures-de-presentation-des-poles/french-poles-de-competitivite-clusters-serving-business-and-job-growth-787.html>

³¹ <http://www.valeurope-san.fr/info/san-val-europe/FR/Presentation/020101>

³² http://fr.wikipedia.org/wiki/Intelligence_%C3%A9conomique

4.4 Strategic Economic Intelligence (SEI)

Another comprehensive formulation of French Economic Intelligence is Strategic Economic Intelligence (SEI) or in French: *Intelligence Economique Stratégique* (IES).

The strategic dimension of EI was already present in the title of the Martre's report (1994). In his preface to the book edited by M.-A. Duval (2008), A. Juillet had already pointed out that "the term of Economic Intelligence is too narrow ... it is likely that the current trend will lead us gradually to a Strategic Intelligence concept, corresponding to apply the methods and tools of economic intelligence in every sector of our environment"³³(in Duval, 2008, 15).

The concept of SEI (Strategic Economic Intelligence) is in this logic.

SEI offers its 12th European Forum on September 2014 on the theme "*L'Intelligence Economique dans la société, les entreprises et les organisations. Les stratégies des acteurs dans un monde en mutation*" in Troyes (France). The different workshops offer to think, in addition to tools and uses of SEI, to the management of crisis, the European dimension of SEI, the success stories of French SMEs, research and territories approaches, and, in partnership with ADBS³⁴ a workshop about to collect and develop the uses of Big Data.

Thematics correspond to the overall perspective drawn by C. Revel (Revel, 2012, 86) of "comprehensive and professional management of economic and geo-economic challenges of globalization in France" to "regain the initiative and intellectual influence and the principle of general interest (Revel, 2012, 231–237)"³⁵.

Each community of researchers and stakeholders (companies leaders, Chambers of Commerce and Industry, experts and consultants): EI, TI, EEI, TEI, SEI ... have their own congresses, seminars, forums, days studies, symposia, often in competition.

4.5 A comprehensive and systemic approach as a synthesis: Strategic, Territorial and Societal Economic Intelligence?

We take the risk of trying to propose a comprehensive and systemic approach in synthesis of the different French approach of EI: Strategic, Territorial and Societal Economic Intelligence (in French: *Intelligence Economique Stratégique, Territoriale et Sociétale*) according to the systemic approach proposed by E. Morin where a system is built by the interactions between all its actors.

The actors were listed by M. Rodriguez³⁶ (2005): Government, Universities, Companies, Associations, Support Organizations ... We more explicitly do reference to Chambers of Commerce and Industry and to Local Authorities.

The different types of watches (technological, commercial, strategic, social ...) (Rouach, 1999, 24–26) correspond to different jobs in the various concerned organizations, which also have the tools and practices that can differentiate them.

These different EI jobs and the different skills covered were defined by a document proposed by the A. Juillet's services (*Référentiel dit de Matignon*) (2005).

Their exercise correspond to different EI situations: forecasting and prospective, support to decision, watching in different areas mentioned, analysis of information ... The concept of situation is essential for us: each EI situation in each organization providing a relevant context for the action can be considered in an approach of "semiotic situational and interactional analysis" (Mucchielli, 2010).

We have recently proposed an approach of Situational Analysis in a case of Territorial Intelligence for the sustainable developed of an area in economic difficulty (Bourret; Meyer, 2014).

5 Innovation's Dimensions

EI has always been linked to innovation. The 12th European forum about SEI offers a workshop on 'leveraging the prospective for innovation.'

The innovation dimension is at the heart of developments over the last 30 years highlighted by G. Gramaccia (2008) cited above. According to L. Ferry (2014), who places in the wake of J. Schumpeter (1942), the "destructive innovation" rather than profit, is the essence of capitalism, constantly offering new products and services destroying the old ones, breaking with traditional values to do the individuals lose their references and only become captive consumers, companies constantly creating new needs. It is also another formulation of "change for change" or "*bougisme*" denounced both by N. Alter and H. Mintzberg.

We consider innovation broadly as proposed by G. Garel (2011) who asked the question of the often difficult relations between management and innovation: "Can we manage innovation?". Management, as it organizes, finalizes and constrains activity, is it opposite to the innovation needs for freedom and autonomy? Does not the organization impede innovation? He proposed a definition of innovation with which we agree: "Innovation is a new way to create

³³ In French : « l'expression d'intelligence économique est trop restrictive ... on peut penser que l'évolution en cours va nous mener progressivement vers un concept d'intelligence stratégique consistant à appliquer les méthodes et outils de l'intelligence économique dans chacun des secteurs de notre environnement ».

³⁴ ADBS: French Association of Professionals of Information and Documentation.

³⁵ In French : « gestion complète et professionnelle des enjeux économiques et géoéconomiques de la France dans la mondialisation » pour « retrouver l'initiative et l'influence intellectuelle et le principe de l'intérêt général ».

³⁶ Available on : http://fr.wikipedia.org/wiki/Intelligence_%C3%A9conomique

value in a broad sense for customers, users, to the entity responsible for innovation or for the individual". For us, innovation is creating value with all the difficulty of moving from the individual to the collective aspects, from the perspective of daily action highlighted by N. Alter (2005).

Innovation has a territorial dimension. We thus find the perspective outlined by Godet - Durance - Mousli (2010) report to "liberate innovation in the territories" and, in particular, innovation in organizational size and / or social size, with the convergence of 3 concepts: "*métis*", "*reliance*" and "*resilience*." The report emphasized the importance of organizational and societal innovations whereas traditionally in France, mainly technical innovation is valued, then it does not create the most jobs. The report presents many examples that can be called TEI, valorizing in particular the case of local companies in the Vendée's department where the number of job seekers is rather low although Vendée is not having major assets.

Club Méditerranée was an organizational innovation in the service sector with a genuine co-production services between GM (nice members) and GO (nice organizers) in the tourism sector and also with a territorial dimension in all places of implementation of its "villages".

"Club Med" was created in 1950 by Belgian Gérard Blitz. The first villages were established in Majorca, Corfu, Djerba ... Gilbert Trigano joined the club in 1954 for the provision of camping equipment. He was going to impose its brand with a model of entertainment around social mixing and shared activities, corresponding to a form of utopia. Success was at the appointment, particularly in the 1980s, with a strong diversification abroad (USA, Japan, China, Thailand ...).

The success was undermined by the start of the Gulf War (1991) which limited the mobility of travelers and serious plane crash in Senegal with the deaths of people going on holiday in the Club's villages. This turning point also corresponded to Gilbert Trigano's departure, in favor of his son Serge. In 1997, the shareholders appointed P. Bourguignon, former CEO of EuroDisney as the new President. It was replaced in 2002 by Henri Giscard d'Estaing. In 2002, the Agnelli's family (Fiat) majority shareholder in the "Club Med" group sold much of its shares to Accor group, which sold them 2008 "Club Med" has very changed. Restructuring, closures of many "villages", and a target shift to a more selected public. Many of its original followers are no concerned by these developments and ask for changing the name of the company.

Although some aspects have been widely criticized, we can consider that the "Club Med" at least in its initial version, corresponded to a specific approach of Territorial Intelligence and Competitive Intelligence in a period of development of a new Services driven Economy with the need to tackle new societal challenges (expatriation, exoticism, looking for relationships ...) around innovation for sustainable growth and welfare in a Welfare and Leisure Society.

Our systemic approach to EI also has a social dimension. In the continuity of G. Garel's proposal, we consider innovation as "value creation", including people becoming committed actors of their own destiny in an interactionist perspective. So we meet the notions of "reliance" and "resilience" (both of individual people and then collective aspects on a specific territory) in a perspective of sustainable development of territories.

6 Societal Intelligence Dimensions

For us EI also has an important societal dimension.

We distinguish clearly the "societal intelligence" from the "social intelligence" envisaged in particular by M. Perrett (2013). For us, the societal dimension of EI is very different from the definition of customer profiles for marketing approach in EEI.

With specific approaches indeed, for us, EI is also concerned by the area of Social and Solidarity Economy (SSE) in the perspective of Keynesian Welfare State

Social protection is not only a cost (symbolized by the debate on the deficit of the Social Insurance in France), but is also an investment, as outlined D. Libault³⁷ (2012) and a factor of competitiveness for the Nation, contributing to the preservation and development of its human capital. It was already the prospect of Carayon's report (2003) that put in relation business competitiveness and social cohesion in Economic or Competitive Intelligence.

In the perspective outlined by P. Clerc and H. Azoulay (in Duval, 2008), the societal dimension of EI may correspond to initiatives to promote the sustainable development on areas in difficulty, particularly for unemployed young people without particular degrees but with some skills and motivations and living in disadvantaged neighborhoods. In this perspective, the Young Creators of Activities Groups (in French GJC : Groupements de Jeunes Créateurs) that developed around DUCAs (Academic Degrees for Creators of Economic Activities)³⁸ and their role as a lever for development: personal reconstruction by creating their own business, are an interesting experience. There are

³⁷ Dominique Libault: is General Director of French EN3S (National School for Social Security) and former Director of Social Security in the Ministry of Social Affairs.

³⁸ Young Creators of Activity Groups (GJC), are now opened to a broader public. They federate partnerships around DUCAs between University (through its IUT : Institutes of Technology), a local mission dedicated to unemployment (*mission locale*) and often shop management (*boutiques de gestion*). The first DUCA was created by the IUT and the local mission of Melun Senart in 2001. Since others were opened especially in Ile-de-France region with the support of the Regional Council (Marne-la-Vallée, Paris, ...). The GJC (15 nowadays) are federated in a national association: the ANGK (National Association of Crators Groups).

some "success stories" in gardening, specific regional food activities, clothes ... Young creators are very proud of their successes for them and for their family, which gives some hope and meaning to their life.

In its social dimension, our overall approach to EI is anchored firmly in the territories. For us, the territory is shaped by local projects (such as territory or context for action of companies) that contribute to its development, particularly in the economic dimension in sensitive areas, such as in the case of Duca.

These projects correspond to the articulation of two key concepts: the "reliance" and "resilience."

The need for reconstruction of the social tie has been repeatedly emphasized especially by S. Paugam (2010). E. Morin and R. Sainsaulieu particularly stressed the need for "reliance" for our entire society, especially outlining the role of "intermediary organizations" and, in the first place, the voluntary sector of associations (Sainsaulieu, 2001).

The concept of "resilience" is also essential. It appeared in the Physical Sciences as the ability of an element to return to its original shape. It then concerned Psychology. Resilience, understood as personal ability of an individual to bounce back in a situation of difficulty or distress, it has gradually shifted to the notion of collective resilience of a group or a community, to get most recently to the notion of resilience of all actors of a territory (Territorial Resilience). This may be illustrated by Creators Groups. In this perspective, Economic Intelligence joins Territorial Intelligence (Bourret-Meyer, 2014).

The synthesis approach of EI we propose is both an essential tool and a way of thinking and acting to support the organization (especially enterprise) or a national or local community in its evolution, it helps including "*savoir affronter l'incertitude*" which, for E. Morin in the "*Sept savoirs nécessaires à l'éducation du futur*" (1999) is a major issue. In his preface to this book, F. Mayor, then Director General of UNESCO, stressed that "one of the most difficult challenges is to change our ways of thinking in order to cope with the growing complexity, to the rapid change and to the unpredictable" ³⁹. We believe that new approaches of Economic Intelligence, focusing on the creation of meaning, cooperation and trust, both internally and externally, based on a global approach of complexity for decision support, can contribute.

In this perspective we have proposed some ways for an approach of Societal (Welfare) and Territorial of Economic Intelligence in a Services driven Economy to tackle societal challenges around new Innovation for Sustainable Growth and Welfare.

7 Conclusion

In this paper we have proposed a synthetic analysis of new approaches of Economic or Competitive Intelligence and especially Societal, Territorial and Welfare and dimensions of Economic Intelligence in a Services driven Economy in France.

We proposed an extension of Economic Intelligence approaches, which, in its beginnings, focused on the industrial sector to new areas explored in territorial, societal as social cohesion, services' innovation on a territory.

EI, very focused in its beginnings on supporting strategic decision in companies in an industrial economy has gradually concerned the services sector with the management aspects of intangible patrimony and all the aspects of digital economy.

Especially we have presented developments and different positions of EI corresponding to its different possible formulations and specific points of views: Entreprise Economic Intelligence (EEI), Territorial Economic Intelligence (TEI), Strategic Economic Intelligence (SEI) ... We propose a formulation of a systemic approach of a global Strategic, Territorial and Societal Economic Intelligence.

For us, EI is "hologrammatic" (in the words of E. Morin and JL Le Moigne) of the issues for any organization (companies, but also regional or local authorities, national States, experts' organizations ...) in a competitive environment: EI as economic intelligence on territories with all the societal dimension as well as information intelligence as organizational intelligence (with dimensions decision support and risk analysis goals but also innovation, cooperation ...)

The elements of thinking are proposed in the perspective outlined by C. Revel already mentioned (Revel, 2012, 86) of a "complete and professional management of economic and geo-economic challenges of globalization in France" to "regain the initiative and intellectual influence and the principle of general interest (Revel, 2012, 231–237). It was already largely that of Carayon's report who hoped to articulate business competitiveness and social cohesion (solidarity) (Carayon, 2003), which is even more justified in times of economic crisis and that of social ties.

We hope that this broad and societal approach of EI can also allow to contribute to "renew the vision of knowledge societies for peace and sustainable development" (Mansell; Tremblay, 2013) in a Services driven Economy to tackle new societal challenges around Innovation for Sustainable Growth and Welfare.

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³⁹ In French : « l'un des défis les plus difficiles à relever serait de modifier nos modes de pensée de façon à faire face à la complexité grandissante, à la rapidité des changements et à l'imprévisible ».

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Quels services entrepreneuriaux pour construire un territoire entrepreneurial durable?

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Introduction

Pour nombre d'économistes, l'entrepreneuriat constitue le moteur du développement économique (croissance économique, création d'emplois et innovation) d'une manière générale et plus particulièrement au niveau local. Mais, le développement de l'activité entrepreneuriale s'appuie également sur un cadre institutionnel approprié (Baumol, 1968,1990). Les politiques publiques peuvent ainsi contribuer à créer un climat des affaires dynamique dans un espace territorial donné. Cette question a été à l'origine depuis une vingtaine d'années de l'apparition d'une grande variété de concepts reliant entrepreneuriat et développement territorial, et plus particulièrement dans un cadre urbain ; la ville étant ayant historiquement joué un rôle économique majeur (Braudel, 1979).

Les concepts de « ville entrepreneuriale » et de « ville durable » ont ainsi été élaborés depuis le début des années 2000, d'abord pour montrer que les initiatives entrepreneuriales prennent place dans un espace géographique donné, dans un cadre institutionnel approprié (Levratto, Torres, 2010), et deuxièmement qu'une ville durable repose sur les trois items du développement durable (efficacité économique, éthique sociale et préservation de l'environnement (Jansson, 2013) et qu'elle constitue le modèle approprié pour répondre aux défis à venir sur le plan urbain en alliant étroitement développement économique, initiative individuelle et protection de l'environnement.

Ce focus sur la ville entrepreneuriale et la ville durable montre l'importance, s'il n'était nécessaire, de la localisation géographique des activités économiques : la ville est en effet appréhendée dans le cadre de ces deux concepts comme un cadre approprié pour le développement d'activités économiques. Cependant, sans remettre en question l'importance au cadre territorial, la référence à la ville stricto sensu nous apparaissant trop restrictive (les frontières urbaines étant essentiellement de nature administrative), nous avons donc opté pour le vocable de territoire, plus générique, tout en conservant le principe d'une combinaison entre entrepreneuriat et préservation de l'environnement. Nous définissons dans ces conditions, le territoire entrepreneurial durable de manière à combiner les notions de ville entrepreneuriale et de ville durable dans un même concept. Un territoire est par conséquent un territoire (soit un espace géographiquement défini) dont le développement repose sur un cadre institutionnel propice à la création d'éco-entreprises et au développement d'éco-activités, ces dernières étant appréhendées comme la source d'une croissance économique à venir respectueuses des ressources naturelles, voire à l'origine d'une troisième révolution industrielle (Demailly, Verley, 2013 ; Rifkin, 2012), combinant à la fois croissance économique, amélioration du bien-être et protection de l'environnement. La création d'éco-entreprises est, dans ce cadre, perçue comme étant le moyen de générer des activités nouvelles respectueuses de l'environnement (York, Venkataraman, 2010), outre le fait que la réglementation environnementale (Porter, Van der Linde, 1995) oblige les entreprises existantes à adopter des modes de fonctionnement plus respectueux de l'environnement. L'initiative individuelle et la régulation publique sont dans notre propos complémentaires, non substituables.

Notre objectif est d'appliquer cette grille de lecture à l'étude d'un territoire particulier, celui de l'agglomération urbaine de Dunkerque (CUD)⁴⁰ située dans le département du Nord de la France, sur le littoral de la Mer du Nord. Ce territoire présente la particularité de s'être développé à partir des années 1960 (et pour une large part à l'heure actuelle également) sur une trajectoire techno-industrielle reposant sur des actifs spécifiques (industrie sidérurgique et métallurgique, puis pétrochimique) qui a imprimé sur plusieurs décennies un développement économique et social local, reposant notamment le salariat ouvrier. La crise de la sidérurgie et des chantiers navals des années 1970, puis le ralentissement de la croissance économique des années 1990, ont conduit les responsables publics à chercher à définir une nouvelle stratégie de développement reposant d'une part sur la diversification des activités industrielles et de l'entrepreneuriat d'autre part, alors que la CUD a développé depuis les années 1990 une politique publique visant à réduire la pollution industrielle, très importante dans l'agglomération.

Dans un contexte économique marqué par une croissance faible, un taux de chômage élevé et des problèmes environnementaux importants, nous nous sommes interrogés sur la possibilité de ce territoire de changer de trajectoire techno-industrielle, de l'industrie lourde et le travail ouvrier salarier, vers un développement économique plus respectueux de l'environnement reposant sur la création d'éco-entreprises. Pour ce faire, nous avons cherché à identifier les ressources entrepreneuriales de ce territoire et les modalités de leur mobilisation. Nous procéderons donc en deux

⁴⁰ La Communauté urbaine de Dunkerque regroupe 18 communes, totalisant environ 200 000 habitants : Dunkerque, Armbouts-Cappel, Bourbourg, Bray-Dunes, Capelle-la-Grande, Coudekerque-Branche, Coudekerque-Village, Craywick, Ghyvelde, Grand-Fort-Philippe, Grande-Synthe, Gravelines, Leffrinckoucke, Loon-Plage, Saint-Georges-sur-l'Aa, Spycker, Tétéghem, Zuydcoote.

temps. Nous présenterons dans un premier notre cadre théorique pour définir le territoire entrepreneurial durable et les indicateurs qui s'y rattachent, pour confronter dans un second temps cadre théorique avec la réalité économique du territoire dunkerquois.

1 Le territoire entrepreneurial innovant : vers la construction d'un cadre théorique

1.1 Cadre d'analyse et concepts

1.1.1 De l'économie territoriale à l'économie des proximités

L'activité économique ne se développe pas de façon homogène au niveau d'un territoire donné. Les raisons de ce développement inégal sont complexes, et ne résident pas uniquement dans la présence ou l'absence de ressources (humaines, naturelles, ou autres). La question du développement économique des territoires, mais également de leur capacité à innover, est explorée par les économistes depuis la fin du 19^{ème} siècle, avec l'accélération de l'industrialisation (Verley, 1997), depuis les travaux fondateurs de von Thunen (2009), Weber et surtout Marshall (1890) dont les économistes ont largement repris et développé les concepts (effets d'agglomération, externalités, etc.) depuis les années 1970. Les théories sur les milieux innovateurs du GREMI pendant les années 1980 ont en effet clairement mis en évidence l'étroit lien entre la dynamique des entreprises présentes sur un territoire et le territoire dans lequel elles sont insérées (Claval, 2008).

Ces considérations nous conduisent à mettre l'accent sur la proximité qui se décline sur différents modes : la proximité est à la fois géographique et organisée par les acteurs économiques insérés dans ledit territoire (Torre, Rallet, 2005 ; Uzunidis, 2010). La proximité géographique désigne en règle générale la distance qui sépare deux agents économiques ou deux entreprises. La proximité organisée se réfère aux réseaux de relations sociales entre différentes entités. Citons à titre d'exemple une entreprise organisant le territoire géographique dans lequel elle est insérée en développant des relations marchandes avec d'autres entités ou des relations sous-traitance industrielle. De la proximité géographique et organisationnelle découle la proximité cognitive entre les agents économiques, sur laquelle nous reviendrons ultérieurement.

L'ensemble de ces notions et concepts forme un corpus, l'économie territoriale, qui se définit aux niveaux géographique et économique. Son objectif est précisément de répondre à trois questionnements : a) comment est organisée la production (quelle est par exemple la part respective de grandes et de petites entreprises ?), b) comment les agents économiques présents sur un territoire innoveront ? Et c) quel est le degré d'attractivité du territoire en matière d'investissements, mais également pour la création d'entreprises nouvelles ? En d'autres termes : comment les ressources et les relations de proximité contribuent-elles à la création d'entreprises d'une part et à améliorer les performances des entreprises existantes d'autre part ? Mais, également comment les entreprises utilisent cette proximité pour exister et croître ?

L'économie territoriale est une discipline scientifique complémentaire de la géographie économique. Celle-ci a développé trois types de proximité auxquelles nous nous référerons dans le cadre de notre analyse : a) géographique (distance), b) économique (relations) et c) organisationnelle (normes et comportements des acteurs économiques – entrepreneurs et entreprises), d'où écoulent deux concepts majeurs : a) les effets externes produits par le territoire par les relations entre les entreprises, ainsi que par d'autres acteurs (relations verticales et/ou horizontales – *supply chain* – formant ensemble une niche de compétitivité grâce à la présence de ressources spécialisées, d'informations, etc. b) Les effets d'agglomération produits par le regroupement spatial d'entreprises (Isnar, 1956), lesquels ont un impact majeur sur la croissance démographique, le développement d'infrastructures, de services aux entreprises, etc., car ils sont porteurs d'externalité positives (réduction de coûts unitaires pour les firmes quelle que soit leur taille).

Ces questions nous conduisent à nous interroger à la fois sur la réalité de l'entreprise (en tant qu'organisation) et de l'entrepreneur (en tant que fonction économique et d'innovation) ? Nous définissons l'entrepreneur comme l'agent économique qui crée un réseau de relations socio-économiques duquel il extrait les ressources en connaissances et financières dont il a besoin pour créer de nouvelles idées et de nouveaux marchés. L'entrepreneur contribue au rayonnement économique d'un territoire, dont il extrait par ailleurs les ressources dont il a besoin.

Partant de ces considérations, nous définissons le modèle du territoire entrepreneurial durable (TED), comme une combinaison des trois types de proximité évoqués ci-dessus : spatiale, organisationnelle et cognitive, l'ensemble de ces proximités participe ainsi à la création d'externalités positives, sources de productivité et d'innovations (produit, procédé, organisationnelle). La proximité spatiale se caractérise par la réduction des distances (et du temps) qui séparent physiquement les acteurs économiques ; condition permissive au développement de relations de reconnaissance et d'inter-reconnaissance entre ceux-ci. La proximité organisationnelle est définie par l'appartenance à une même organisation (entreprise, laboratoire de R&D, université, service à l'intérieur d'une même organisation ou administration, etc.), à un même réseau (intra-organisationnel et/ou inter-organisationnel) ou, plus largement à une même « communauté de destin » (Uzunidis, 2010). La proximité cognitive renvoie à l'adhésion des acteurs à une même conception de l'innovation, au même paradigme (technologique et/ou organisationnel), aux mêmes routines, heuristiques, algorithmes de pensée, conventions, traditions, croyances, codes internes, langages et/ou procédures d'apprentissage, de délibération, de prise de décision et de gouvernance (Depret, Hamdouch, 2004). Elle se situe donc au sein même des organisations, des réseaux et des communautés.

Les relations de proximité contribuent à la coordination du processus d'innovation (Madeuf et al., 2005). Celui-ci, à la fois flexible et évolutif, impose à l'entreprise ou à l'entrepreneur le besoin impératif de disposer des différents types de moyens technologiques et intellectuels, d'acquérir et de combiner en permanence des ressources matérielles et immatérielles. D'un autre côté, la théorie de la connaissance appliquée à l'entreprise nous enseigne que la capacité d'adaptation et l'efficacité de l'entreprise dépendent de ses capacités cognitives, de ses codes d'interprétation de l'information elle-même, de ses compétences et de ses procédures mises en œuvre pour la résolution des problèmes qu'elle rencontre (Dosi et al., 1999). L'information scientifique, technique et industrielle constitue un système de connaissances (capital savoir) qui sont articulées, formalisées et susceptible d'être communiquée ou transférée. Ce système est un moyen de production identifiable en tant que tel (Laperche, 2001, 2007). Son utilisation est source d'innovation dans le déroulement normal du processus de production. La tâche du dirigeant ou de l'entrepreneur consiste donc à trouver l'équilibre entre la gestion des partenariats et le développement des instruments internes de l'organisation (Laperche, et al., 2006). Pour survivre et se développer une entreprise doit acquérir de nouvelles connaissances, grâce auxquelles elle pourra créer de nouvelles compétences.

Largeement fondé sur la thèse de Marshall, Piore et Sabel (1984) avaient construit un modèle de la production flexible où la proximité reposait sur des relations multidirectionnelles et horizontales. La dynamique de l'évolution des structures et de l'organisation du système local de production met en évidence l'importance des petites entreprises. Plus flexibles et plus adaptables, elles sont plus aptes que les grandes à renouveler le système local et productif et à créer de nouveaux emplois. En outre, la proximité entre les grandes et les petites entreprises sont aussi encastrées dans le système social et politique local. Les institutions sociales locales (Etat, collectivités territoriales, entreprises) tiennent un rôle significatif dans l'organisation et l'évolution de l'activité économique au niveau d'un territoire géographique donné. Cet espace a en effet été façonné au cours du temps par des rapports de pouvoir, des rivalités, des relations de concurrence et de coopération entre les acteurs (Benko, Lipietz, 2000) qui ont contribué à façonner son image, sa bonne ou sa mauvaise réputation. Ainsi, la région du Nord-Pas de Calais dans laquelle se situe la CUD a été façonnée depuis le 19^{ème} siècle (et même bien avant, dès la Renaissance) par une activité industrielle intense (textile, sidérurgie, extraction houillère, etc.), qui en a fait l'une des régions pionnières de l'industrialisation française. A l'heure actuelle, ce passé industriel est encore bien présent, pas seulement dans les friches industrielles (dont nombre sont depuis devenues des hauts lieux du patrimoine industriel et culturel de la région), mais dans le poids relativement important des grandes entreprises industrielles (par rapport à la moyenne nationale) et par son corollaire, le poids relativement important de la population salariée ouvrière.

1.1.2 La proximité spatiale

La prise en considération de la proximité spatiale consiste à mettre l'accent sur le raccourcissement des distances géographiques entre les acteurs économiques (entre les entreprises elles-mêmes, entre les entreprises et les institutions publiques). Ce rapprochement géographique, voir l'« atmosphère industrielle » qui en est le produit (Marshall, 1890, 1958), a clairement été identifié par nombre de chercheurs en économie et en géographie comme étant propices à l'innovation et à la créativité. Les théories des milieux innovateurs (Maillat, Perrin, 1992) et les clusters (Porter, 1998, 2003), s'appuyant sur cette observation, mettent en évidence dans leurs travaux la capacité d'un territoire à innover en prenant en considération l'émergence de nouvelles entreprises en tant que telles et la création d'entreprises nouvelles par des firmes existantes et/ou des institutions publiques de recherche par exemple, résultant précisément de cette proximité géographique.

Le territoire se présente alors comme un système territorialisé de valorisation de capitaux, de production et d'échanges (marchandises, d'informations, de capitaux, de connaissances, etc.). Sa caractéristique principale est la formation et la mise en valeur des ressources spécifiques et la réalisation des combinaisons particulières de ces ressources spécifiques. Cette approche intègre à la fois les relations inter-entreprises et l'intervention des acteurs institutionnels que nous avons évoquée plus haut.

1.1.3 La proximité organisationnelle

La proximité spatiale façonne les comportements entrepreneuriaux et institutionnels, contribuant à créer des relations synergiques entre les acteurs. L'environnement de l'entreprise est alors considéré comme un ensemble de ressources qui relie les différentes composantes de la firme, séparées verticalement ou horizontalement par la division du travail.

La théorie des réseaux consiste à replacer l'entreprise dans son environnement. Cet environnement est riche et ne se réduit pas à des relations marchandes. Camagni (1991) appréhende ainsi l'environnement de l'entreprise comme un ensemble de ressources qui relie les différentes composantes de la firme organisée verticalement ou horizontalement par la division du travail. L'environnement de la firme (quelle que soit sa taille) n'est pas alors considéré comme une donnée naturelle, voire neutre, mais il est perçu comme le produit de décisions prises par les acteurs économiques. Les firmes contribuent ainsi à façonner par leurs décisions l'environnement économique et social dans lequel elles sont encastrées.

Selon le contexte économique (caractérisé par un taux de croissance économique donné), les entreprises vont soit opter pour une organisation concentrée ou au contraire déconcentrée. Toute firme peut être amenée par exemple à déconcentrer son activité en fonction des effets d'agglomération du territoire dans lequel elle est insérée. Ces effets

d'agglomération vont générer des externalités en matière de communication et d'information. Ils vont aussi contribuer à la diversification de l'offre (via une stratégie plus fine en matière de division du travail), élargir le marché du travail (besoin de nouvelles qualifications et/ou compétences). On observe un double phénomène, d'une part un phénomène de la localisation de nature centripète, d'autre part de nature centrifuge. Le premier contribue au regroupement des activités pour exploiter les économies d'échelle, ainsi générées, le second contribue à la dispersion dans un espace géographique donné de l'activité économique, pour tirer profit des effets de spécialisation et des économies d'échelle qui en découlent.

Cependant, la proximité organisationnelle ne se limite pas aux seules firmes et aux stratégies qu'elles développent pour capter des nouvelles ressources, elle émane également des institutions (publiques pour une large part) qui interviennent pour stimuler et/ou accompagner la création d'entreprises. Les collectivités territoriales (au niveau local, régional ou autres) se livrent à des opérations de surenchères pour attirer des entreprises et/ou des entrepreneurs, pour générer des activités nouvelles. Le concept très connu de la classe créative (Florida, 2003) participe cet état de faits, la réussite économique des villes en particulier (de territoires en général) serait en effet liée à leur capacité d'attirer des acteurs économiques créatifs (par exemple des diplômés de haut niveau), porteurs de nouveauté et de créativité en ce début de siècle, période où l'activité économique reposerait en priorité sur des savoirs de haut niveau (tableau 1).

Tableau 1. La classe créative de R. Florida.

Eléments de définition de la « classe créative »
<p>Corrélation positive entre la croissance économique des villes et l'existence en son sein d'une classe créative.</p> <p>Une classe créative est composée d'individus créatifs hautement diplômés, des individus engagés dans la résolution de problèmes inédits, s'appuyant sur des connaissances complexes et des individus impliqués dans les professions des arts, de la mode, du design, etc.</p> <p>La classe créative contribue à créer un « people climate ».</p> <p>Pour se développer une ville doit être en capacité d'attirer des talents.</p> <p>Les « 3T » : Talent, Technologie, et Tolérance.</p>

Source : Florida, 2002.

1.1.4 La proximité cognitive

La proximité cognitive renvoie au partage plus ou moins formalisé d'expériences, de représentations, codes, langages, modèles qui résultent de, et facilitent dans le même temps la communication de toute information au sein des organisations. La proximité cognitive s'appuie sur un réseau dense de relations sociales que nous avons évoqué plus haut (proximité organisationnelle). Par ailleurs, les firmes produisent des flux d'information en leur sein (entre les différents services constituant une entreprise), une partie de celles-ci est aussi diffusées vers l'extérieur (vers d'autres entreprises ou des institutions publiques, mais aussi les consommateurs). La proximité cognitive est facilitée par les proximités spatiale et organisationnelle et contribue notamment à la création de communautés de pratiques, via l'atmosphère industrielle évoquée plus haut.

1.2 Le territoire entrepreneurial durable, cadre théorique et définitions

1.2.1 Une définition générique

Partant de ces considérations préalables, le territoire entrepreneurial durable (TED) repose sur l'interaction de quatre items qui découlent des trois types de proximité que nous avons énoncés : a) politique publique et réglementation (fiscalité, conseil, financement, etc.), b) entrepreneuriat et le potentiel de ressources de l'entrepreneur (création d'entreprises, développement des entreprises existantes, opportunités entrepreneuriales, etc.), c) innovation et ressources technologiques (programme de recherche & développement (R&D), relations de coopération entre les entreprises et/ou les universités et/ou les centres de recherche) et d) le climat économique propre au territoire (taux de croissance économique, part des petites et moyennes entreprises par rapport au nombre total d'entreprises, etc.). Ces quatre items interagissent de manière synergique au niveau d'un espace spatial donné, soit d'un territoire donné (figure 1).

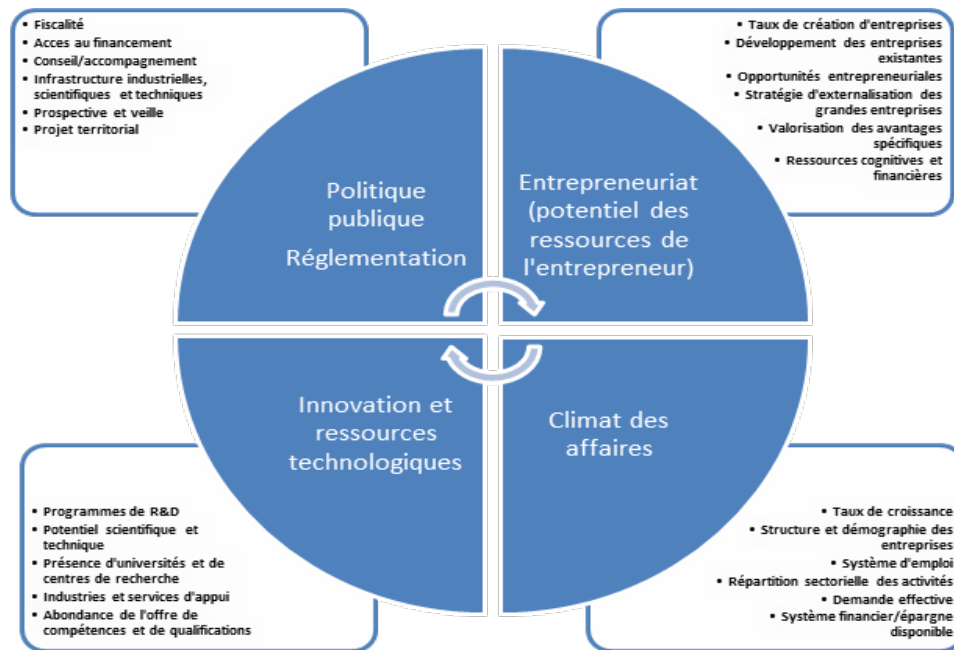


Figure 1. Le territoire entrepreneurial durable (TED).

Le concept du territoire entrepreneurial durable réunit les trois formes de proximité (spatiale, organisationnelle et cognitive) précédemment décrites. L'activité économique se déroule dans un cadre géographique donné (le territoire). Les acteurs privés et publics organisent ce territoire, pour les premiers en développant des activités ou en en créant de nouvelles. Les seconds définissent des politiques de développement dont l'objectif est de favoriser le développement d'activité. La proximité organisationnelle s'appuie et contribue à nourrir la proximité cognitive entre les acteurs économiques et institutionnels, favorisant l'innovation et la création d'activités. S'agissant d'un territoire entrepreneurial durable, l'objectif n'est pas seulement de créer des activités nouvelles en général, mais des éco-activités en particulier.

1.2.2 Le Territoire entrepreneurial durable : quels indicateurs ?

A partir de cette définition générique du territoire entrepreneurial durable, nous avons retenu (via la figure 1) un ensemble d'indicateurs pour l'évaluer (tableau 4). Dans le tableau ci-dessous, nous avons distingué quatre items : 1) le contexte entrepreneurial et le climat des affaires, 2) le contexte institutionnel en faveur de l'entrepreneuriat, 3) le contexte environnemental et 4) le contexte technique et scientifique.

- 1) L'item « contexte entrepreneurial et le climat des affaires » regroupe des informations relatives à la fois sur la densité du tissu économique local (concentré ou décentralisé via la part des PME par rapport au nombre total d'entreprises), le dynamisme entrepreneurial (taux de création d'entreprises), enfin il faut aussi prendre en compte la durée de vie des entreprises et la part de la population activité salariée par rapport à l'emploi total. Même s'il est possible d'exercer une activité entrepreneuriale en tant que salarié (e), la part des travailleurs indépendants est un bon indicateur de l'activité entrepreneuriale dans un territoire, quelle que soit la taille de celui-ci.
- 2) L'item « contexte institutionnel en faveur de l'entrepreneuriat » permet d'évaluer la capacité d'un territoire donné à créer un contexte favorable à la création d'entreprises et à leur développement. Nombre de travaux de recherche ont montré l'importance du contexte institutionnel pour soutenir et encourager l'entrepreneuriat depuis les travaux fondateurs de Baumol (1990, 1993). Par le biais de mesures de politique publique et par la mise en œuvre d'une réglementation appropriée, les comportements individuels sont orientés de manière par exemple à soutenir les initiatives individuelles. Les institutions formelles et informelles doivent être distinguées. Les premières sont celles qui sont précisément créées par le biais de mesures de politique publique comme énoncé plus haut. Les secondes découlent de la proximité cognitive et sont façonnées par les coutumes, les traditions, les valeurs, etc. et forment l'encastrement socio-économique dans lequel sont insérés les acteurs économiques : les autorités locales ont-elles mis en place des mesures de sensibilisation à la création d'entreprises vis-à-vis de publics divers comme par exemple les jeunes, les personnes âgées, etc. Pour les personnes ayant un projet plus ou moins arrêté, des agences de conseil et de suivi à la création ont-elles été prévues ? Quel est leur rôle par exemple en matière de financement, pour monter le business plan ? La période de suivi s'arrête-t-elle dès la création de l'entreprise ou se poursuit-elle pendant plusieurs années ? Nous sommes en ce sens proche de la définition de la ville entrepreneuriale adoptée par Levratto et Torres (2010). Mais, d'autres éléments peuvent également être pris en considération, comme la taille de la ville (les grandes villes

sont-elles plus dynamiques en matière d'entrepreneuriat ?), l'initiative individuelle et l'enseignement supérieur (Barreneche Garcia, 2014). Cette conception de la ville entrepreneuriale met implicitement en évidence une très vieille idée que les utilitaristes, comme C. Beccaria ou P. Verri, avaient développé dès le 18^{ème} siècle selon laquelle en substance le marché n'est jamais saturé, mais que la dynamique entrepreneuriale est cumulative. On retrouve cette idée dans la définition de la Fédération canadienne de l'entreprise indépendante (FCEI) (Mallett, Gaudreault, 2013) selon laquelle les villes qui sont aujourd'hui des villes entrepreneuriales le sont parce qu'elles étaient déjà dans le passé, les premiers habitants ayant cherché à exploiter avec efficacité les ressources dont ils pouvaient disposer dans le territoire qui est devenu la ville entrepreneuriale dynamique actuelle. La FCEI classe les villes canadiennes à partir de 14 indicateurs répartis en trois groupes définis comme suit : a) présence, c'est-à-dire une représentation de l'importance et de la croissance de l'entrepreneuriat et de la diversité industrielle, b) perspective, soit des indicateurs associés à l'optimisme et aux plans de croissance et c) politiques, soit les indicateurs associés aux mesures prises par les administrations municipales en matière d'imposition et de réglementation des entreprises (tableau 2). La particularité de l'étude canadienne est de combiner à la fois des données statistiques, des faits et sondages d'opinion. Contrairement à la conception de Levratto et Torres (2010) (tableau 2) et de Barreneche (2014), la FCEI ne mentionne pas la présence d'institutions d'enseignement supérieur et/ou d'universités, elle est davantage orientée vers le dynamisme entrepreneurial existant et sur les modalités de l'action publique au niveau du territoire urbain.

Tableau 2. La ville entrepreneuriale : éléments de définition.

<i>Critères de définition de la ville entrepreneuriale selon le classement de la fondation ECER (European Cities Entrepreneurship Ranking)</i>
Promotion : événements, université, guides, NTIC, etc. Anté-crédation : viabilité du projet prévisionnel d'activité, services juridiques, formations, etc. Post-crédation : services, gestion opérationnelle, accès études, durée d'accompagnement, etc. Financement : soutien des organismes publics, investissements privés, fonds de garanties, aides publiques, etc. Environnement économique : transport, énergie et développement durable, amélioration urbaine, cadre de vie, capital connaissance, disponibilité compétences, réseaux, immobilier d'entreprise, etc.
<i>Les trois déterminants d'une ville entrepreneuriale d'Andrés Barreneche Garcia</i>
Taille de la ville Initiative individuelle Institution d'enseignement supérieur
<i>Critères de définition de la Fédération Canadienne de l'entreprise indépendante</i>
<i>Présence</i> Augmentation des établissements commerciaux Etablissements commerciaux par habitant Taux d'emploi indépendant en pourcentage de l'emploi total Entreprise du secteur de l'information et de la culture <i>Perspective</i> Prévision du rendement des entreprises Attentes relatives à l'embauche de salariés à plein temps Etat général de l'entreprise Permis de construction d'établissements commerciaux, industriels et institutionnels Satisfaction à l'égard de la vie <i>Politiques</i> Equilibre fiscal de l'administration municipale Coût de l'administration municipale Sensibilisation de l'administration municipale aux petites entreprises locales Rendements municipaux Présence d'outils d'information en ligne pour les permis et les licences Evolution par rapport à 2012

Source : Levratto, Torres, 2010.

Le principe du concept de la ville entrepreneuriale vise en définitive à expliquer comment l'entrepreneuriat se développe dans un cadre urbain déterminé en particulier en mettant l'accent sur les moyens d'accompagnement à la création d'entreprise, mais également à l'environnement économique dans lequel se développe l'activité entrepreneuriale, y compris en soulignant l'importance des institutions d'enseignement supérieur (Levratto, Torres, 2010 ; Barreneche, 2014).

Le concept récemment développé par Acs et al. (2014) du système national de l'entrepreneuriat, qui part d'une réflexion critique sur le concept très connu du système national d'innovation est riche d'enseignement. Les auteurs partent de l'observation selon laquelle le concept du système national d'innovation ignore l'entrepreneur, qui est pourtant un acteur fondamental de l'innovation, en référence aux écrits de Schumpeter, de Kirzner et Von Mises sur lesquels s'appuient principalement Acs et al. (2014, p. 479). Ces derniers définissent le système national de l'entrepreneuriat comme suit : la dynamique, institutionnellement intégrée d'interactions entre des attitudes entrepreneuriales, la capacité et les aspirations par des individus, en qui entraîne l'affectation de ressources vers la création d'entreprises et de nouvelles activités entrepreneuriales. Le système national de l'entrepreneuriat se définit par conséquent comme un ensemble d'interactions systémiques dans un cadre institutionnel préalable défini pour soutenir l'activité entrepreneuriale précisément. Les auteurs ont réuni pour ce faire 18 indicateurs (tableau 3). Ces indicateurs sont placés dans un contexte institutionnel qui prend en compte 17 autres indicateurs⁴¹.

L'objectif d'Acs et al. (2014) est de réunir les données nécessaires pour construire un modèle économétrique (ce qui n'est pas notre intention à ce stade de notre recherche). Pour notre part, nous en avons tiré quelques éléments pour construire le modèle du territoire entrepreneurial durable.

Tableau 3. Les indicateurs du système national d'entrepreneuriat.

Indicateur	Description
Reconnaissance des opportunités	Pourcentage de la population âgée entre 18 et 64 ans indiquant qu'elle pense qu'il y aura de bonnes opportunités entrepreneuriales dans leur région et qu'elle les réalisera au cours des six mois à venir
Qualification	Part de la population âgée entre 18 et 64 ans déclarant avoir les connaissances et les qualifications pour créer une entreprise
Attitude face au risque	Part de la population âgée entre 18 et 64 ans indiquant que la peur de la faillite ne doit pas les empêcher de créer une entreprise
Situation des entrepreneurs existants	Part de la population âgée entre 18 et 64 ans qui connaissent personnellement une personne qui a créé une entreprise au cours des deux dernières années
Carrière	Part de la population âgée entre 18 et 64 ans qui pensent que créer une entreprise est un bon choix de carrière
Statuts	Part de la population âgée entre 18 et 64 ans qui accordent aux entrepreneurs qui réussissent un haut statut social
Statuts et carrière	Moyenne entre les deux indicateurs précédents
Motivation	Taux de création d'entreprises créées par une opportunité d'affaire
Entreprises créées par des femmes	Part des femmes créatrices par rapport au nombre total d'entreprises
Niveau technologique	Part des entreprises créées dans des secteurs de moyenne ou de haute technologie
Niveau d'éducation	Taux de création d'entreprises créées par des dirigeants ayant suivi des études secondaires
Concurrents	Taux d'entreprises créées dans des marchés où beaucoup d'entreprises n'offrent pas le même produit
Nouveaux produits	Taux d'entreprises créées qui offrent des produits nouveaux pour au moins quelques consommateurs
Nouvelles technologies	Taux d'entreprises créées utilisant des technologies de moins de cinq ans
Présence de gazelles	Taux d'entreprises créées ayant un taux élevé en matière d'emploi (qui attendent d'avoir plus de 10 salariés en cinq ans)
Exportation	Taux d'entreprises créées exportant une partie de leur production
Investissement informel	Montant moyen de l'investissement informel par personne au cours de trois dernières années
Présence de Business angels	Part de la population âgée entre 18 et 64 ans réunissant des fonds pour soutenir la création d'entreprises par d'autres entrepreneurs

Source : Acs et al., 2014, p. 482.

⁴¹ Marché intérieur, urbanisation, marché de l'agglomération, éducation supérieure, risque d'affaire, usage d'Internet, corruption, libéralisme économique, égalité des sexes, capacité d'absorption de nouvelles technologies, formation du personnel, dominance du marché, dépenses nationales de RD, stratégie des entreprises, globalisation et taille du marché des capitaux.

Mais dans notre cas, s'agissant d'un territoire entrepreneurial durable, nous serons attentifs au fait que les autorités locales privilégient par une politique de soutien adéquate la création d'éco-entreprises, ceci en liaison à la fois avec l'item du contexte environnemental, mais également du tissu économique local (industriel, tertiaire, concentré, etc.). La politique d'accompagnement des entreprises peut être prolongée par la création de zones d'activité (éco-zone, parcs scientifiques ou autres), combinant à la fois proximité spatiale et organisationnelle.

- 3) L'item « contexte environnemental » apporte des informations sur la capacité d'un territoire en faveur de l'environnement : quelle est sa politique en matière de développement durable et pour protéger la biodiversité ? Des moyens financiers sont-ils alloués en ce sens de manière également à sensibiliser la population à cette question. Enfin, un ensemble d'autres questions doivent être étudiées, telles que l'existence d'une politique au niveau locale particulière active en matière d'énergies renouvelables, ou encore pour privilégier l'éco-construction (au-delà de la réglementation en la matière), le tri sélectif et le traitement des déchets ménagers ou encore la mise en œuvre d'une politique en faveur de l'écologie industrielle, en coopération avec les acteurs privés présents sur le territoire. La définition de la ville durable est assez complexe, sauf à appliquer les trois piliers du développement durable : efficacité économique, intégration sociale et protection de l'environnement.

Le concept de la ville durable suscite de nombreuses controverses et fait l'objet de définitions très variées (tableau 4). Il est bien antérieur au concept de développement durable lequel remonte au rapport Brundtland à la fin des années 1980. Le concept de la ville durable tire ses racines d'une réflexion beaucoup plus ancienne qui remonte aux années 1960-1970 voire au début du 20^e siècle avec les travaux de l'urbaniste Patrick Geddes (1915). Celui-ci considérait que les processus sociaux et la formes qu'ils prennent dans l'espace sont liés et qu'en modifiant la forme il était possible de modifier la structure sociale. Ces premières approches de la ville durable sont très intéressantes car elles mettent l'accent sur deux points qui sont largement plébiscités à l'heure actuelle : d'une part l'autosuffisance, on parlerait aujourd'hui de circuits courts, d'autre part sur la qualité de l'environnement physique et par conséquent de la qualité de vie des habitants, éléments que nous retrouvons dans le concept actuelle de la ville durable, en sachant et comme le souligne la Charte d'Aalborg : « chaque ville étant différente, c'est à chacune qu'il appartient de trouver sa propre chemin pour parvenir à la durabilité » (cité par Emelianoff, 2007, p.52).

Les définitions de la ville durable par les chartes européennes ont largement mis l'accent sur les aspects sociaux, c'est notamment le cas de la Charte d'Aalborg (1994). La Charte de Leipzig (2007) met notamment l'accent sur la lutte contre les inégalités par exemple en créant et/ou préservant des espaces publics de qualité, en développant un système de transport urbain et en renforçant l'économie locale. Le ministère de l'écologie en France par la circulaire du 23 mars 2009 relative à la Territorialisation de la mise en œuvre du Grenelle de l'environnement a créé les éco-cités qui repose sur les trois piliers du développement durable : économique, social et écologique. Tout comme les éco-quartiers, mais à une échelle moins importante sur le plan territorial.

Tableau 4. La ville durable : une large gamme de définitions.

<i>Les trois piliers de la ville durable (à partir de Attour, Depret, 2014)</i>
Dynamisme économique : créativité, innovation, entrepreneuriat et attractivité Intégration des communautés : emploi local, mieux vivre ensemble, démocratie participative, préservation du patrimoine Protection de l'environnement et amélioration du cadre de vie des habitants
<i>Définition de la ville durable par David Morris (1982) (Emelianoff, 2007)</i>
Le développement autosuffisant est un développement qui stimule la capacité à satisfaire localement les besoins fondamentaux. Une ville qui réussit sur le plan du développement durable est une ville dont les nombreux et divers objectifs des habitants et des entreprises sont atteints sans que le coût en soit supporté par d'autres personnes ou d'autres régions
<i>Définition de la ville durable par G. Haughton et C. Hunter (1994) (Emelianoff, 2007)</i>
Une ville durable est une ville dans laquelle les habitants et les activités économiques s'efforcent continuellement d'améliorer leur environnement naturel, bâti et culturel, au niveau du voisinage et au niveau régional, tout en travaillant de manière à défendre toujours l'objectif d'un développement durable global.
<i>Définition de la ville durable par Cyria Emelianoff (2007)</i>
Une ville capable de se maintenir dans le temps, de garder une identité, un sens collectif, un dynamisme à long terme Une ville offrant une qualité de vie en tous lieux et des différentiels moins forts dans les cadres de vie, exigeant une forte mixité sociale et fonctionnelle Une ville d'où émerge un projet politique et collectif, dans la ligne de l'Agenda 21 de Rio (article 28). La ville durable ne doit pas exporter les coûts d'urbanisation et son développement sur les autres populations, les générations futures ou sur les écosystèmes. La ville durable doit combiner qualité de vie, réduction des inégalités sociales et réductions des inégalités écologiques. Pour cela un projet global est nécessaire.

A partir de ces définitions assez globales de la ville durable, des chercheurs ont entrepris de définir une grille de lecture pour classer des villes en fonction de leur degré de durabilité. Tanguay et al (2010) ont regroupé les indicateurs suivants sous les trois piliers du développement durable (tableau 5). A partir des grandes catégories qui sont ci-dessous identifiées, des informations plus précises sont recensées, comme par exemple la densité de la population urbaine, la qualité des déchets, le taux de criminalité, la participation de la population à l'administration des affaires publiques, le nombre de ménages ayant un faible revenu, la qualité des déchets recyclés, le taux de diplômés dans la population âgée de plus de 18 ans, etc. La multiplication du nombre de variables présente l'avantage d'un modèle plus précis permettant de cerner tous les aspects d'une ville durable. Mais, la multiplication du nombre de variables peut également conduire à complexifier inutilement le modèle.

Tableau 5. Définir la ville durable par des indicateurs économiques, sociaux, institutionnels et environnementaux.

<i>Dimension du développement durable</i>	<i>Indicateurs</i>
Economique	Revenus et dépenses des ménages Emploi et chômage Activités économiques
Social et institutionnel	Démographie Habitat Education Sécurité Santé Bien-être Services sociaux Gouvernance Budget des administrations publiques
Environnemental	Energie Transport Qualité de l'air Bruit Eau potable Espaces verts, écosystème et patrimoine Déchets

Source : Tanguay et al.,2010, p. 411.

- 4) Le « contexte technique et scientifique » permet de réunir des informations sur la capacité scientifique et technique du territoire, sur ses ressources scientifiques et techniques. Existe-il sur le territoire une université, des centres de recherche, publics ou privés, des écoles d'ingénieurs ? Quel est le taux de diplômés ? Ce point est rarement abordé en tant que tel, sauf à mettre explicitement l'accent sur les structures de l'enseignement supérieur comme nous l'avons vu ci-dessus.

Dans le tableau 6 nous avons réuni l'ensemble des indicateurs définissant le territoire entrepreneurial durable en vertu des quatre items que nous avons distingué et des diverses définitions (ville entrepreneuriale, ville durable, etc.) que nous avons présentées ci-dessus.

Tableau 6. Le TED, la construction d'un indicateur synthétique.

Items	Caractéristiques majeures
Contexte entrepreneurial et climat des affaires	Part des PME/nombre total d'entreprises, globalement et par secteur Taux de création d'entreprises Taux de pérennité des entreprises à 1 an et à 5 ans Taux de la population salariée Répartition de la population active par CSP Niveau de qualifications et compétences Présence sur le territoire de complexes industriels (voire de sites à risques)
Contexte institutionnel en faveur de l'entrepreneuriat	Politique de sensibilisation vis-à-vis des jeunes (et d'autres publics sensibles par exemple les personnes âgées, les chômeurs de longue durée, etc.) en faveur de l'entrepreneuriat Politique d'accompagnement à la création d'entreprise Présence d'agences à l'accompagnement à la création d'entreprise Présence d'incubateurs, de parcs technologiques, de ruches d'entreprises, etc. Fiscalité en faveur de l'entreprise

Items	Caractéristiques majeures
Contexte environnemental	Politique publique en faveur du développement durable et de la biodiversité Programme de recherche en faveur des éco-technologies Programme pour faciliter l'utilisation des énergies renouvelables Soutien spécifique en faveur des éco-entreprises Développement d'une stratégie d'économie industrielle Mise en place d'une politique de collecte, tri et traitement des déchets ménagers
Contexte technique et scientifique	Présence d'un centre universitaire Présence de laboratoires de recherche publics ou privés Taux de diplômés

Notre objectif est dans la seconde partie, d'appliquer cette grille de lecture au cas particulier de l'agglomération dunkerquoise.

2 Dunkerque, vers un territoire entrepreneurial durable ?

2.1 La construction d'une agglomération sur le temps long

2.1.1 Points de repères historiques

L'étude d'un territoire donné ne se réduit pas à la description de son état présent, sauf à considérer cette situation comme l'aboutissement d'une évolution sur le long terme. Par cette description sur le long terme, nous avons donc cherché à identifier la trajectoire techno-industrielle de ce territoire, avant de chercher à identifier les indicateurs qui pourraient un territoire entrepreneurial durable.⁴²

Le territoire de la CUD présente la caractéristique principale d'être un site industrialo-portuaire dont l'origine remonte au début des années 1960 pendant la période de la reconstruction (Laperche et al., 2011). L'économie locale se trouve ainsi encadrée dans une trajectoire techno-industrielle particulière : la construction du site sidérurgique a généré une importante population ouvrière employée dans de grandes entreprises. L'objectif des autorités publiques est alors de réduire la concentration des activités économiques dans la métropole parisienne (Gravier, 1947) en créant les « pôles de croissance », capables de réorienter les flux économiques (Perroux, 1955). Il s'agissait également de restructurer l'industrie pour faire face à la concurrence internationale de plus en plus forte et de mieux insérer l'industrie française dans la division internationale du travail. C'est dans cet esprit que furent également construites les zones industrialo-portuaires de Dunkerque, Fos-sur-mer (près de Marseille) et Le Havre (Vigarié, 1979). Les restructurations industrielles qui ont marqué depuis ces territoires n'ont pourtant jamais effacé leur spécialisation industrielle.

Nous distinguons trois périodes (plus une) dans l'évolution du territoire dunkerquois : 1) la phase d'industrialisation, 2) la crise économique et 3) la reconversion fondée sur la diversification des investissements et 4) le développement de l'entrepreneuriat.

2.1.2 La phase d'industrialisation

L'industrialisation lourde débute à Dunkerque dans les années 1960 (Boutillier, Uzunidis, 1998 ; Coppin et al., 2000). Il ne s'agit pas du produit de relations de proximité organisationnelle entre des acteurs économiques vivant sur un même territoire (proximité spatiale), mais d'une industrialisation forcée, décidée de façon unilatérale et construite de toutes pièces par l'Etat, notamment dans le cadre des cinquième et sixième plans (respectivement 1966-1970 et 1971-1975). Le choix des sites industriels qui recevront d'importants investissements publics est réalisé par la DATAR, créée en 1963 en privilégiant les zones 1) en crise dans le but de ré-équilibrer les niveaux de développement, 2) situées en bord de mer afin de pouvoir jouer un rôle d'interface entre les courants commerciaux internationaux et nationaux. A la différence de Fos-sur-mer, Dunkerque est d'emblée isolée dans son hinterland. Lille (actuellement le troisième port fluvial français) est historiquement reliée par le biais de canaux et de voies terrestres aux ports belges et hollandais (tels Rotterdam et Anvers). Dunkerque n'a donc pas pu créer de synergies économiques entre entreprises et institutions pour créer des « effets d'agglomération endogènes » (Fujita, Mori, 1996) conséquents dans la région du Nord/Pas de Calais.

L'industrialisation de Dunkerque s'inscrit ainsi dans la stratégie de restructuration de l'industrie (lourde) qui repose sur l'installation d'industries sidérurgiques au bord de l'eau. Dunkerque peut ainsi importer des matières premières d'outremer, moins onéreuses que l'utilisation du charbon et du fer extraits des mines du Nord/Pas de Calais et de Lorraine. Ces grandes unités sidérurgiques, « unités motrices », doivent ensuite créer des effets d'entraînement conséquents en aval et en amont de la filière et ainsi constituer un « pôle de développement ».

Le complexe industriel dunkerquois se construit autour d'Usinor. La décision d'implantation est prise en 1956, la production débute en 1962. A partir d'Usinor se constitue un pôle sidérurgique et métallurgique en liaison avec les

⁴² L'afflux de ces ouvriers généra au début des années 1960 un problème de logement important. Les ouvriers furent d'abord logés dans des caravanes, en attendant la construction de logements HLM.

chantiers navals implantés à Dunkerque depuis 1898⁴³ : Usinor (devenu Arcelor, puis Arcelor-Mittal), Vallourec (devenu Europipe), Creusot Loire (Vadunes et Ascométal), viennent d'adjoindre aux chantiers navals de France. Les sociétés de raffinage British Petroleum-Elf et Total-Compagnie française de raffinage partagent un certain nombre d'équipements productifs et utilisent le même réseau d'oléoducs. Elles fournissent l'énergie nécessaire (via EDF) et les hydrocarbures dont ont besoin les entreprises du premier groupe. Elles font pression pour susciter la formation d'une filière pétrochimique à Dunkerque pour diversifier et développer leur clientèle locale. La construction d'un vapocraqueur, mis en service en 1978, a pour but de répondre à cette demande et a pour conséquence de nouvelles implantations d'entreprises en aval de la filière. Enfin, de grandes entreprises « périphériques » peu intégrées à la filière métallurgique sont également présentes. Leur installation a essentiellement été motivée par la situation géographique de Dunkerque : dans l'agro-alimentaire, c'est le cas de Lesieur implantée depuis le début du 20^{ème} siècle et dans le secteur de la cimenterie, de Lafarge. A cela s'ajoute un ensemble de petites et moyennes entreprises (PME) spécialisées dans les activités portuaires qui se répartissent en deux groupes : celles qui entrent dans le réseau de sous-traitance des grandes entreprises industrielles et du bâtiment d'une part, et celles qui poursuivent leur propres objectifs de production d'autre part.

L'implantation de ce complexe industriel repose sur une forte intervention de l'Etat par le biais de mesures directes (subventions, réduction d'impôts) qui sont destinées à financer la plus grande partie des travaux d'infrastructures (en matière portuaire notamment). Les apports des commandes publiques sont considérables. Par l'intermédiaire des grandes entreprises publiques, l'Etat est allé au-devant de tous les besoins d'Usinor : énergie (implantation de la centrale nucléaire de Gravelines⁴⁴), moyens logistiques (construction d'une gare de triage, construction de voies navigables), en approvisionnement en matières premières au prix le plus bas possible.

2.1.3 La reconversion fondée sur la diversification des investissements

Dans les années 1980, la politique industrielle et d'aménagement du territoire change de cap. En 1984 les pôles de reconversion sont lancés. Dunkerque est l'un d'entre eux sur les 15 créés. Ce sont des zones géographiques où la restructuration de certains secteurs industriels engendre d'importantes difficultés économiques et sociales. C'est dorénavant l'attractivité des investissements (notamment étrangers) qui doit permettre de relancer l'activité économique. Par ailleurs, les investissements privés doivent prendre le pas sur les investissements publics comme outils principaux de la reconversion et du développement des territoires (Ziel, 1998).

De 1970 à la fin des années 1980, le nombre d'implantations étrangères est modeste (4 en 1970 et 17 en 1988). Leur nombre augmente pendant les années 1990 (70 établissements étrangers à Dunkerque en 1997 (dont 49 unités dans l'industrie et 21 dans le tertiaire. En 2009/2010, les établissements étrangers implantés à Dunkerque regroupaient 13 000 emplois, positionnant Dunkerque comme le deuxième site de la région du Nord/Pas de Calais en capitaux étrangers après Lille (Laperche et al., 2011). Depuis cette période, la situation s'est cependant fortement dégradée, nombre d'investisseurs étrangers se sont retirés ou sont en passe de l'être. Mais, la stratégie de diversification n'a pas abouti. L'économie dunkerquoise reste concentrée sur l'industrie lourde. A l'heure actuelle, Dunkerque regroupe 13 sites classés SEVESO, soit le plus important site français. Avec l'implantation du terminal méthanier, un quatorzième site sera implanté prochainement. La date de son entrée en service ayant été retardée à plusieurs reprises, il n'est pas possible pour l'heure d'en donner la date exacte.

A la fin des années 1990, les investissements étrangers ont contribué à développer le complexe industrialo-portuaire de Dunkerque. C'est aussi au début des années 1990 que l'Université du Littoral Côte d'Opale (ULCO) ouvre ses portes pour participer au renouvellement des qualifications et des compétences répondant au besoin d'une économie du 21^{ème} siècle. Cependant le territoire industriel dunkerquois reste très fragile et très concentré. Les six filières regroupent la plus grande partie de l'emploi industriel, certaines d'entre elles sont extrêmement concentrées comme l'énergie, la sidérurgie (tableau 7).

⁴³ La fin du 19^{ème} siècle est marquée en France par un effort important d'industrialisation qui se concrétise notamment par la construction de voies ferrées et l'aménagement des sites portuaires (le Plan Freycinet du nom du ministre des travaux publics de l'époque, lancé en 1878). A Dunkerque, ces travaux de modernisation ont eu un impact important sur l'activité économique avec la création de grandes entreprises, comme Lesieur créée en 1908 pour bénéficier des avantages logistiques du port (importations d'arachides des colonies africaines françaises).

⁴⁴ Il s'agit de la plus grande centrale nucléaire d'Europe de l'ouest, soit la deuxième d'Europe, après la centrale ukrainienne de Zaprija.

Tableau 7. Les six principales filières industrielles dunkerquoises.

Filières	Nombre d'entreprises	Nombre global de salariés	Nombre moyen de salariés
Energie	9	2545	282
Sidérurgie	9	7143	797
Métallurgie	261	7248	28
BTP	388	5524	14
Chimie-parachimie	31	1747	56
Agro-alimentaire	47	1704	36

Source : Chiffres Ville Dunkerque, Chambre de commerce et d'industrie de la côte d'Opale, consulté le 29/05/2014.

Dunkerque est le premier pôle énergétique européen composé de la centrale nucléaire, le terminal gazier qui voit transiter depuis la Norvège l'équivalent du tiers de la consommation française en gaz naturel, la plus importante unité de production de gaz industriels, une activité de raffinerie, la réception du Port de Dunkerque de plus de 6 millions de tonnes de charbon par an. Mais, certains secteurs qui perdent le plus d'emplois en France sont surreprésentés sur le territoire dunkerquois. Il s'agit en particulier de la sidérurgie/métallurgie, activité où Dunkerque détient une position de leader en particulier avec Arcelor-Mittal, mais également avec d'autres grosses entreprises : Ascométal, Valdunes, Aluminium Dunkerque et Ajinomoto.

Arcelor-Mittal Dunkerque est considéré à l'heure actuelle comme une des unités les plus performantes d'Europe en dépit des réductions d'effectifs qui se justifient par les gains de productivité et l'externalisation de fonctions. D'autres grandes entreprises dunkerquoises affichent aussi une santé fragile. L'entreprise de métallurgie, Ascométal, ancienne filiale d'Usinor, appartient désormais au fonds d'investissement Apollo qui est son principal actionnaire. L'entreprise emploie 1900 salariés en France répartis sur 10 sites dont les trois principaux sont Dunkerque (avec 550 salariés), Hagondange (Moselle) et Fos sur mer (Bouches du Rhône). Actuellement, le groupe doit faire face à une dette de 360 millions d'euros contractée lors de son rachat par Apollo en 2011, et a été placé en redressement judiciaire en mars 2014. Un accord a été recherché entre le fonds d'investissement et les banques créancières : Morgan Staley et Bank of America. Plusieurs repreneurs se sont faits connaître : deux fonds américains (Apollo et Anchorage), une offre du groupe brésilien Gerdau et une émanant d'investisseurs français (portés par la Holding Sparking Industrie). C'est cette dernière offre qui a été retenue par le Tribunal de commerce de Nanterre⁴⁵. Le problème principal de l'entreprise ne serait pas tant celui du marché⁴⁶, que du management que l'entreprise doit améliorer sur quatre points majeurs : qualité des produits, rapidité de livraison, prix et innovation⁴⁷.

Valdunes, leader européen des roulements ferroviaires, a également été placé en redressement judiciaire en mars 2014. Elle emploie 500 salariés dans le Nord-Pas de Calais, dont 479 dans l'agglomération dunkerquoise. Plusieurs de ses marchés se sont en effet effondrés (fret ou transport de personnes), la société ayant été écartée de plusieurs appels d'offre de la SNCF en particulier. En un an, son chiffre d'affaires a baissé de 25%. Quatre offres de reprises ont été annoncées⁴⁸. L'offre retenue est celle du groupe chinois M. A. Steel, leader chinois de la sidérurgie, est l'une des cinq entreprises cotées en Bourse en Chine. L'entreprise est essentiellement présente sur le marché chinois pour des trains. M. G. Valdunes va ainsi entrer sur le marché des TGV chinois. Pour sa part, le groupe chinois va profiter du réseau commercial de sa nouvelle filiale française. Le groupe chinois a l'intention d'investir dans un centre de recherche mondial sur les produits ferroviaires dans sa filiale française qui devrait ainsi participer aux programmes de recherche du pôle de compétitivité I-Trans. Les usines seront modernisées et les emplois maintenus⁴⁹.

Aluminium Dunkerque appartient au groupe anglo-australien depuis 2007. Implanté à Dunkerque depuis 1991, le site assure les deux-tiers de la production française d'aluminium. Elle est aussi la plus grosse unité de production d'aluminium de l'Union européenne. Elle emploie 615 salariés à Dunkerque et en fait vivre environ 3000 autres dans la région du Nord-Pas de Calais. Le groupe est accusé de vouloir délocaliser ses usines dans les pays émergents où l'énergie est bon marché. 82 millions d'euros ont cependant été investis en 2012-2013 pour la construction d'un nouveau four et une nouvelle station électrique. D'autres projets d'investissements sont aussi à l'étude, mais 65 salariés vont perdre leur emploi d'ici 2015, et un plan d'économie a été mis en place. Pour des raisons de compétitivité. Par

⁴⁵ Cette offre a été choisie car elle sauvegarde le plus d'emplois. Elle prévoit la levée de 230 millions d'euros de financement et bénéficie de 35 millions d'euros de prêt de l'Etat, via le fonds d'investissements économique et social. Le gouvernement envisage aussi de faire entrer la banque publique d'investissement BPI France dans le capital du groupe. L'objectif de l'offre française est de faire redevenir Ascométal le leader européen des aciers spéciaux, pour ensuite envisager une consolidation européenne (*Le Monde*, 22/5/2014, *Les échos*, 22/5/2014). Les quatre actionnaires individuels (Franck Supplisson, Jacques Schaffnit –actuel président d'Ascométal - Guy Dollé et Noël Forgeard) n'apportent que 10% des fonds, 80% des apports proviennent de groupes financiers majoritairement étrangers.

⁴⁶ Le groupe est spécialisé dans des aciers spéciaux pour les secteurs de l'automobile, du pétrole et de l'industrie mécanique.

⁴⁷ Source : AFP, 5 mars 2014, *Nord Littoral*, 12 mars 2014.

⁴⁸ Source : AFP, 23 avril 2014.

⁴⁹ Source : *L'usine nouvelle*, 2 juin 2014.

ailleurs, le contrat signé avec EDF signé en 1991 pour alimenter l'entreprise à un prix très bas se termine fin 2016. Or EDF ne sera plus en mesure d'assurer le même tarif, en particulier en raison de la réglementation européenne⁵⁰.

Enfin, Ajinomoto est un groupe japonais spécialisé dans la production d'aspartame, il emploie à Gravelines (sa seule usine européenne) 103 salariés, auxquels s'ajoutent 30 emplois induits. Cependant, en raison de la surproduction mondiale d'aspartame, le groupe japonais a décidé de recentrer son activité sur le Japon et a mis en vente l'unité de production de Gravelines. Le site est installé depuis 1991 à proximité de l'usine Coca-Cola⁵¹, l'un de ses principaux clients. Il a été initialement créé en partenariat entre Ajinomoto et l'américain Monsanto, sous le nom d'Euro-aspartame. En 2000, suite au désengagement de Monsanto des édulcorants, Ajinomoto a repris l'intégralité des actifs via sa filiale Sweeteners Europe. En 2006, Ajinomoto avait annoncé sa volonté d'accroître ses capacités de production essentiellement au Japon et dans une moindre mesure au Gravelines. Mais, depuis les prévisions concernant l'augmentation de la demande mondiale d'aspartame ont fondamentalement changé. Par ailleurs, le coût de production de l'unité française est 30 à 40% supérieur aux unités chinoises concurrentes. Mais, la chute des ventes est également due à l'arrivée sur le marché d'un nouveau produit, une alternative naturelle aux édulcorants de synthèse, la Stevia⁵².

De plus, d'après le tribunal de commerce de Dunkerque, en 2013, plus d'un millier de salariés dunkerquois (contre 712 en 2012) ont été concernés par des procédures, soit de sauvegarde, de redressement ou de liquidation judiciaire, soit une augmentation de 45% par rapport à 2012. Le nombre de procédures cependant n'a augmenté que de 6%, mais celles-ci ont concerné davantage de salariés. Ce sont donc des entreprises de taille importantes en termes d'effectifs, mais aussi des entreprises plus anciennes. Même constat inquiétant pour le nombre d'ordonnances d'injonction à payer, qui est passé de 620 à 682 entre 2012 et 2013. Ce qui montre que les entreprises ont de plus en plus de difficultés à payer leurs charges et ont par conséquent des problèmes de trésorerie⁵³.

Les groupes multinationaux ont une stratégie globale où les territoires sont des réservoirs de ressources, qu'elles soient humaines, énergétiques, financières ou infrastructurelles. En conséquence, les entreprises localisent et délocalisent leurs activités en fonction des ressources offertes sur un territoire donné (cf. craintes d'Aluminium Dunkerque pour le renouvellement du contrat avec EDF. De nombreuses entreprises se sont localisées à Dunkerque pour bénéficier des infrastructures (port, prix des terrains⁵⁴). Une réglementation tatillonne, l'évolution négative du marché (voir par exemple la baisse de la demande d'aspartame), le prix d'une ressource qui augmente brutalement peuvent faire évoluer les choses très rapidement. Par ailleurs, la pression financière sur ces grandes entreprises est de plus en plus forte, compte tenu de la composition de leur capital. Les fonds d'investissement recherchent la création d'une valeur pour l'actionnaire, « Shareholder value », souvent au détriment des résultats économiques. La nécessité de faire face à la concurrence des pays à bas coûts de production (Chine, pays émergents) impose une croissance à l'efficacité et de l'innovation, mais qui nécessite du même coup des investissements conséquents, qui se heurtent précisément à la pression de la finance. Les groupes industriels mondialisés appréhendent le marché mondial comme un immense terrain de jeu sur lequel il place leurs pions.

D'un autre côté, suite à la fermeture des chantiers navals et problèmes économiques multiples, les institutions locales (Ville, Communauté urbaine, Port autonome) ont misé dans les années 1980 sur le renforcement de l'attractivité de la ville grâce au développement d'un nouveau cadre urbain et d'amélioration de l'offre de services aux particuliers. Ce grand projet, « Opération Neptune », financé pour partie par des fonds européens, repose sur la valorisation des friches industrielles pour reconstruire le centre-ville et pour que la ville s'ouvre sur la mer. Le projet Neptune a été fortement critiqué car les habitants ne se seraient pas approprié ce nouveau lieu. A partir de 2001, l'agence d'urbanisme de dunkerque et souligne la nécessité de construire une « ville à vivre » (Boissonnade, 2011), point de départ d'une réflexion qui donnera naissance à l'éco-quartier. En 2011, un éco-quartier situé sur les friches des chantiers a vu le jour. L'éco-quartier doit répondre à une nécessité de mixité sociale. Mais, quel que soit le type d'habitation (HLM, pavillon ou appartement de standing), les bâtiments sont chauffés par le réseau de chauffage urbain qui fonctionne en récupérant une partie de la chaleur d'Arcelor-Mittal. Cependant, si le quartier est desservi par une ligne de bus, aucun commerce (y compris alimentaire) n'a encore été implanté. Une vie sociale semble avoir du mal à se développer, les habitants ayant des difficultés pour s'approprier les lieux, y compris ce que suppose un éco-quartier en termes d'usage limité de l'automobile et du tri des déchets.

⁵⁰ Sources : *Le Monde*, 12/06/2014, *L'usine nouvelle*, 18/04/2014, *La voix du nord*, 10/04/2014, 24/04/2014, 17/05/2014.

⁵¹ Coca-Cola possède cinq unités de production en France. Coca-Cola Dunkerque produit 90% de la production du groupe en France. Le site est même l'un des premiers producteurs d'Europe occidentale, avec 360 000 canettes de coca-Cola à l'heure. Il est implanté à Socx, près Dunkerque, depuis 1989. La moitié de la production de Socx est exportée. Son activité est très importante. Un emploi Coca-Cola en induit 12 autres. L'usine de Socx se distingue par des efforts particuliers pour réduire sa consommation d'énergie (-20% depuis 2008) et d'eau (-15% depuis 2008). Des techniques ont été développées de manière à recycler l'énergie d'une machine à une autre. Pour réduire la consommation d'eau des compteurs affichent la consommation en temps réel et ligne de production par ligne de production. Grâce à l'ensemble de ces efforts, l'usine consomme 1,19 litre d'eau pour produire un litre de boisson, contre 1,65 en 2004.

Sources : *Les échos*, 2/04/2013, *FR 3 Nord Pas de Calais*, 17/04/2014.

⁵² Sources : *La Voix du Nord*, 30/04/2014, *L'usine nouvelle*, 2/05/2014.

⁵³ Source : *La Voix du Nord*, 15/01/2014.

⁵⁴ Si des entreprises, y compris des entreprises à risques, classées SEVESO, bénéficient de bonnes conditions d'accueil en matière du prix des terrains et peuvent développer ainsi leur activité. D'un autre côté, cette facilité a un impact sur le prix des terrains des habitations de particuliers qui se trouvent à proximité (Grislain-Letrémy, Katossky, 2013).

Mais, l'agglomération dunkerquoise cherche également à privilégier le développement de la culture. Ce fut notamment le cas dans le cadre des manifestations qui ont eu lieu en 2013 « Dunkerque, capitale régionale de la culture », le Fonds régional d'art contemporain (FRAC), situé dans un des anciens ateliers de construction navale, a également ouvert ses portes. Mais, au-delà des manifestations d'inauguration, le site peine à se développer et cherche encore son public.

En dehors du FRAC, d'autres bâtiments industriels anciens – dont la construction remonte pour la plupart à la fin du 19^e siècle – ont été réhabilités principalement situés dans le quartier de la Citadelle, haut lieu de l'activité économique et maritime jusqu'aux années 1960 (date de la construction du port industriel) : des entrepôts de matières premières (tabac, sucres, par exemple), immeubles de sociétés commerciales et maritimes, bâtiments industriels (minoterie, filature) (voir tableau 8). Le recensement (qui n'est pas exhaustif) donne une idée de l'évolution de l'organisation économique sur le territoire de l'agglomération dunkerquoise, des activités économiques qui se sont succédées. L'activité de ces bâtiments industriels historiques, dont un grand nombre a été réhabilité, se concentre autour du port : sociétés de transport maritime, stockage de marchandises, fabrication de biscuits alimentaires pour les marins, de toiles de jute (sacs, bâches, etc.).

Tableau 8. Le patrimoine industriel dunkerquois réhabilité (sélection).

Nom du bâtiment	Année de construction	Utilisation originelle	Date de réhabilitation	Utilisation actuelle
Entrepôt des tabacs 1	1868	Construit par un entrepreneur dunkerquois est vendu à l'Etat pour conserver le tabac venant des colonies	Fermé en 1972 Racheté par la CUD en 1974	Musée portuaire depuis 1992
Entrepôt des tabacs 2	1881	Stockage de tabac		Université du littoral depuis 1991
Immeuble de la société Worms et Cie	1835	Société d'armement de navires de commerce	Transformé au début des années 1920 restauré après la seconde guerre mondiale	Société Sagatrans (entreprise de transport maritime)
Entrepôt réel des sucres (ou Halle aux sucres)	1897 (début des travaux) 1899 (fin des travaux)	Lien de stockage de denrées alimentaires	Remis en état après la guerre (propriété du Port Autonome) puis transféré à la CUD	Remis en état après la guerre A partir de 2014/2015 accueillera : Centre de mémoire de l'agglomération Agence d'urbanisme de Dunkerque Ecole nationale des cadres territoriaux
Entrepôt réel des sucres (ou Halle aux sucres) Construction d'un deuxième bâtiment	Entre 1900 et 1902	Lieu de stockage de denrées alimentaires	2014 Ouverture d'un learning center Implantation de services administratifs et transfert du centre de formation des cadres territoriaux	Bombardé en 1940 rasé en 1946
Maison Coquelle-Gourdin	1908	Résidence privée d'un entrepreneur, Félix Coquelle qui fut aussi député et maire de Rosendaël	La maison a été cédée à la ville par la famille en 1941	Propriété de la CUD Depuis 1992 siège de la MJC de Rosendaël
La « cathédrale » des Chantiers de France	1949	Construction de navires	Rénovée pendant les années 1990	Chantiers navals fermés en 1987 FRAC depuis 2013

Nom du bâtiment	Année de construction	Utilisation originelle	Date de réhabilitation	Utilisation actuelle
Les entrepôts frigorifiques de l'Union	1955	Mise en service d'un nouveau magasin frigorifique pour remplacer l'ancien construit pendant la première guerre mondiale Stockage de denrées alimentaires	?	Propriété du Port autonome Loué depuis 1987 par le Centre d'archives du Nord SAS
La minoterie Fichaux	1856	Transformation du blé en farine Fabrication de pain ou biscuits de mer pour la marine	Entièrement détruit pendant la seconde guerre mondiale à l'exception du magasin industriel transformé pendant les années 1950 en usine à textile	En cours de rénovation
Filature Rigot-Stalars	1865	Fabrication de produits textiles en coton puis se spécialise dans le jute et la confection de toiles, sacs, bâches et ficelles Rachetée par la société Rigot-Stalars à la fin de la première guerre mondiale	Fermée en 1972	Diverses occupations : concessionnaire automobile puis magasin de meubles jusqu'à la fin des années 1990. Racheté par la ville depuis et restaurée

Sources : Archives municipales, Dunkerque Magazine et observations personnelles.

2.1.4 Construire un cadre propice au développement de l'entrepreneuriat

Pour faire face au déclin de l'emploi (en grande partie ouvrier) salarié et à la montée du chômage, les responsables politiques (au niveau national et local) ont cherché à favoriser la création d'entreprises. Les mesures prises au niveau local, en l'occurrence de la CUD, sont le produit des mesures définies au niveau national qui se mettent en place progressivement à partir de la fin des années 1970. Après plusieurs décennies pendant lesquelles l'emploi se conjugait forcément avec salarié, la transition vers l'entrepreneuriat est une opération difficile.

A partir de la fin des années 1990⁵⁵, trois grands textes de lois ont été promulgués pour promouvoir l'entrepreneuriat en France. Le premier, par ordre chronologique, est spécifique à l'entrepreneuriat scientifique (loi de 1999 sur l'innovation et la recherche), le deuxième a pour objectif majeur de faciliter la création d'entreprise (loi pour l'initiative économique de 2003) et la troisième est notamment à l'origine du statut de l'auto-entrepreneur (loi de modernisation de l'économie de 2008). Il ne s'agit pas de détailler chacun de ces textes de lois, mais de mettre l'accent sur un processus qui a débuté depuis la fin des années 1990 et qui vise à assouplir le cadre administratif de la création d'entreprise en France. Toutes les catégories de la population peuvent être concernées : les salariés, les hommes et les femmes, les jeunes et les personnes âgées, les diplômés ou non diplômés, les chômeurs ou les salariés. Un ensemble de dispositions a été prévu. La loi de 2003 d'initiative économique constitue une étape importante dans ce processus puisque d'une part elle vise à alléger la procédure administrative de création, mais aussi et surtout en supprimant le principe d'un montant de capital minimum pour créer une SARL. La loi de 2008 de modernisation économique va dans le même sens en créant le statut de l'auto-entrepreneur. La création d'une auto-entreprise est ouverte à tous, que l'on soit salarié ou demandeur d'emploi, étudiant ou même fonctionnaire⁵⁶, qu'il s'agisse d'une activité principale ou complémentaire. Le chiffre d'affaires ne doit pas être supérieur à 80 000 euros HT pour une activité d'achat/revente, de vente à consommer sur place et de prestation d'hébergement ou de 32 000 euros HT pour les prestations de services. La procédure de création est très simple. Elle se fait par voie électronique. L'auto-entrepreneur reçoit un numéro SIREN.

Mais, au-delà du cadre institutionnel visant à faciliter sur le plan administratif la création d'entreprises, il est également nécessaire d'accompagner et de conseiller le futur entrepreneur. C'est le rôle des boutiques de gestion, qui ont vu le jour pendant la décennie 1980. La création des boutiques de gestion relève d'une initiative individuelle, même si elles entretiennent des partenariats avec des institutions publiques, telles que les chambres de commerce et

⁵⁵ La volonté visant à promouvoir l'entrepreneuriat ou tout au moins à protéger les petites entreprises est bien antérieure à cette période : loi Royer en 1973, suppression de la patente en 1977 remplacée par la taxe professionnelle.

⁵⁶ Les fonctionnaires sont nombreux à devenir auto-entrepreneurs selon la Commission de déontologie de la fonction publique. Les secteurs privilégiés sont : le commerce, l'hôtellerie, la restauration, métiers liés au bien-être et au conseil, les services à la personne, les travaux de BTP chez les particuliers. Les fonctionnaires qui optent pour ce statut ne réduisent pas leur activité professionnelle principale, mais profitent de leurs jours de congé pour exercer une activité complémentaire.
<http://www.initiatives.tv/1149-le-statut-de-l-auto-entrepreneur-profite-aux-fonctionnaires.html>

d'industrie, la Caisse de dépôts et Consignations, etc. A l'heure actuelle, dans l'agglomération dunkerquoise, la création d'entreprise est bien encadrée. L'ensemble de ces institutions se partagent des candidats à la création d'entreprise, relativement peu nombreux.

Lanterne rouge pendant de longues années en matière de dynamisme entrepreneurial, la région du Nord-Pas de Calais a construit depuis le début des années 2000 un cadre institutionnel visant à promouvoir la création d'entreprise (Cour des comptes, 2012). Le programme de soutien à la création d'entreprise dans le Nord-Pas de Calais est lancé en 2001 grâce à l'action combinée de l'Etat, du conseil régional, des conseils généraux du Nord et du Pas de Calais, la Caisse des dépôts avec l'appui de l'APCE⁵⁷, qui créent le PRCTE⁵⁸ 1 (2000-2009). L'objectif affiché est de passer de 10 000 à 15 000 créations d'entreprises par an. Le PRCTE repose sur sept objectifs⁵⁹. Ces objectifs ont été élargis dans le cadre du PRCTE 2 (2010-2013)⁶⁰. D'autres programmes ont été lancés dans ce cadre, comme par exemple : le développement de l'économie sociale et solidaire, de l'artisanat ou des entreprises commerciales et de services. Un effort particulier a également été réalisé pour soutenir l'innovation dans des secteurs ciblés. Citons à titre d'illustration : l'éco-construction, les matériaux avancés (biosourcés, textiles composites), le traitement des déchets (Cour des comptes, 2012, tome 3, p. 230).

Au niveau de la CUD proprement dite un ensemble de mesures a été prises pour faciliter la création d'entreprises d'une part, et attirer de nouveaux investisseurs d'autre part.

L'aide à la création d'entreprise repose sur deux principes le financement des structures d'aide à la création d'entreprise d'une part, et le développement de l'entrepreneuriat d'autre part. La CUD consacre, selon ses propres sources, un budget de 520 000 euros par an pour soutenir l'activité économique locale. Depuis 2001, environ 1500 entreprises auraient ainsi été créées, soit près de 4000 emplois. La CUD finance des professionnels d'aide à la création (exemple : Flandre initiative, Flandre création, etc.), qui apportent gratuitement leur aide aux porteurs de projets. Mais, sont également présents sur le territoire dunkerquois des réseaux nationaux (exemple : Entreprendre ensemble) et les relais institutionnels classiques (CCI, chambre de métiers et de l'artisanat, etc.), l'université et les ruches d'entreprises (tableau 9). A cet ensemble s'ajoute Dunkerque Promotion, dont le rôle n'est pas, contrairement aux structures précédentes n'a pas pour mission de soutenir les porteurs de projets, mais pour améliorer l'attractivité du territoire dunkerquois, pour en particulier attirer de grandes entreprises, créatrices d'emplois salariés.

Tableau 9. Les institutions d'aide à la création d'entreprises dans l'agglomération dunkerquoise et le type d'aide apportée.

Institutions	Types d'aide apportée
<i>Graines d'affaires</i> Coopérative d'activité et d'emploi pour aider pour les personnes désirant tester leur projet grandeur nature	Liquidation judiciaire
<i>Graines de bâtisseurs</i> Coopérative d'activité et d'emploi dans le bâtiment	Liquidation judiciaire
<i>Flandre création</i> Boutique de gestion soutenue par la CUD Association loi 1901	Accompagnement des créateurs et de repreneurs d'entreprise de la naissance du projet à l'autonomie complète Formation à la création et à la gestion d'entreprise Aide au montage de projets financiers et administratifs et vérification de la cohérence du projet Aide à la recherche de financement

⁵⁷ APCE : Agence pour la création d'entreprise.

⁵⁸ PRCTE : programme régional de création et de transmission des entreprises.

⁵⁹ Les sept objectifs du PRCTE 1 sont les suivants : 1/ amener le NPC au niveau national de la création et reprise d'entreprise, 2/ faciliter l'égal accès de tous les publics à l'initiative, 3/ mobiliser l'ensemble des acteurs pour susciter en région l'esprit d'initiative et l'envie d'entreprendre, 4/ sensibiliser les chefs d'entreprise susceptibles de céder leur entreprise et préparer les transmissions, 5/ organiser un dispositif de proximité lisible et performant destiné à accueillir, accompagner et former les porteurs de projets et suivre les entreprises nouvelles, 6/ permettre la création d'un dispositif de financement et de garantie adapté aux besoins de toutes les entreprises, et 7/ encourager la mise en œuvre des acteurs, renforcer les coopérations territoriales et fonctionnelles, faciliter les échanges d'informations et d'expérience (Cour des comptes, 2012, tome 3, p. 228).

⁶⁰ Les objectifs du PRCTE 2 sont les suivants : 1/ développer des politiques en faveur de publics spécifiques (femmes, jeunes, auto-entrepreneurs), 2/ territorialiser le PRCTE en s'appuyant notamment sur les communautés d'agglomération, 3/ développer des dispositifs de formation à la création et la reprise d'entreprise et le volet ressources humaines, et 4/ articuler le PRCTE aux autres thèmes du Schéma régional de développement économique (SRDE) (Cour des comptes, 2012, tome 3, p. 228).

Institutions	Types d'aide apportée
<i>Initiative Flandre</i> Boutique de gestion Association loi 1901 soutenue par la ville de Dunkerque	Complète l'offre de services de <i>Flandre création</i> Prêts d'honneur (prêts sans garantie ni intérêts) Subventions A aidé en 2013 près de 230 entreprises, soit 580 emplois générés ou consolidés
<i>Chambre de commerce et d'industrie de la Côte d'Opale</i>	Accompagnement à la création d'entreprise pendant trois ans
<i>Chambre de métiers et de l'artisanat</i>	Accompagnement pour la création d'entreprises artisanales
<i>Université du Littoral Côte d'Opale</i>	Licence professionnelle et master professionnel pour la création d'entreprise
<i>Entreprendre ensemble</i> Association loi 1901 Appartient au réseau Entreprendre ensemble	Accompagnement des créateurs et repreneurs Financement sous forme de prêts d'honneur Action spécifique en faveur des ppublic en difficulté
<i>Centre Entrepreneuriat du littoral (CEL)</i> Université du Littoral Côte d'Opale	Public étudiant uniquement Sensibilisation à l'entrepreneuriat Formation à l'entrepreneuriat Accompagnement hébergement
<i>Couveuse d'entreprise Dunkerque Littoral</i>	Créée par <i>Flandre création</i> Tester son projet en grandeur réelle avant de démarrer pendant une durée de 6 à 12 mois
<i>Comité Local d'Aide aux Projets (CLAP)</i>	Aider et accompagner les 16-30 ans qui ont un projet culturel, sportif, humanitaire ou économique Soutien logistique, technique et financier éventuel
<i>Ruche d'entreprises de Saint-Pol-sur-Mer</i>	Accompagner et héberger pendant la phase de démarrage (maximum 48 mois) les porteurs de projets dans les technologies de pointe
<i>Dunkerque Promotion</i> Association loi 1901 Regroupe six partenaires : CUD, CCI, Port autonome, Ville de Dunkerque, Conseil général du Nord, Communauté de communes des Hauts de Flandre	Prospection de porteurs de projets Gestion des projets d'implantation, de développement et d'investissement d'entreprise Promotion économique du territoire de Dunkerque et de sa région Améliorer l'attractivité du territoire dunkerquois

2.2 L'agglomération urbaine de Dunkerque : un territoire entrepreneurial durable ?

L'agglomération dunkerquoise est-elle un territoire entrepreneurial durable ? L'enquête sur le terrain étant en cours de finalisation, nous avons réuni dans le tableau ci-dessous (tableau 10), les indicateurs effectifs permettant que qualifier (ou non) cette agglomération comme un territoire entrepreneurial durable.

Tableau 10. L'agglomération urbaine de Dunkerque : un territoire entrepreneurial durable ?

Items	Caractéristiques appliquées à l'agglomération dunkerquoise
Contexte entrepreneurial	Taux de chômage supérieur à la moyenne nationale (13,4%) – contre 11 pour la moyenne nationale 92% de la population active est salariée (contre 90% au niveau national) Taux de création d'entreprise 15,4% en 2012 (comparable à la moyenne nationale) Economie dominée par un noyau de grandes entreprises industrielles (Arcelor-Mittal, EDF, etc.) et la fonction publique territoriale (la CUD est le 2 ^{ème} employeur de l'agglomération) Pôle d'excellence de l'énergie Importance de l'entrepreneuriat parapublic et associatif 13 sites classés SEVESO Centrale nucléaire

Contexte institutionnel en faveur de l'entrepreneuriat	Réseau dense d'agences d'accompagnement à la création d'entreprise : chambre de commerce et de l'artisanat, Flandre initiative, Flandre création, Entreprendre ensemble, consultants, etc. Un pôle universitaire : l'Université du Littoral-Côte d'Opale Centre d'apprentissage Ruche d'entreprises de Saint-Pol et de nombreuses zones d'activité
Contexte environnemental	Développement de l'écologie industrielle Coopération avec l'ULCO pour mesurer la qualité de l'air Programme de protection de la biodiversité Première ville française pour avoir mis en œuvre le tri sélectif des déchets 2010 : organisation de la 6 ^{ème} conférence européenne des villes durables et ratifie la charte d'Aalborg Construction d'un éco-quartiers sur la friche des chantiers de France Réseau dense de transport urbain (bus circulant au gaz naturel, mais usage de la voiture dominant) Plan d'action de la Maison du Développement Economique entre 2012 et 2014 pour favoriser l'adaptation des emplois et des compétences aux évolutions induites par les mesures du Grenelle de l'environnement pour renforcer l'information dans ce domaine, sensibiliser les professionnels du bâtiment, etc.

Éléments de conclusion (provisoire)

En dépit des efforts entrepris pour déconcentrer l'activité économique et promouvoir l'entrepreneuriat (taux de création d'entreprise en nette hausse depuis 2010, en particulier grâce au statut de l'auto-entrepreneur), la CUD reste dominée par l'emploi salarié (public et privé) et les grandes unités de production dans l'industrie lourde (sidérurgie) et l'administration territoriale. Le contexte social difficile (fort taux de chômage) ne contribue pas à créer une demande sur laquelle des entreprises pourraient être créées et se développer. La présence de grandes entreprises, mobilisant des actifs spécifiques importants, contribue à rigidifier ce territoire qui a énormément de difficultés à se transformer pour devenir un territoire entrepreneurial durable.

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Purchasing business solution services: A review

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The purpose of this paper is to provide an overview of the literature currently available on purchasing integrated business-to-business services and solutions based on the method of systematic review. By thorough retrieval methods, an exhaustive sample of 34 relevant papers was compiled. The key research themes identified in the data set are buyer-supplier relationships, organizational buying behavior, the changing of business models, sustainability, and governance and contracts. The study concludes that a major gap exists in this field of research. Due to its high practical relevance, this domain provides ample research opportunities for both servitization and purchasing scholars.

1 Introduction

Reflecting the increasing importance of services in all industries, the past two decades have been characterized by a proliferation in service research. Initially, scholars have focused on consumer services, professional services, business-to-business (B2B) services and industrial services; however recently, increasing attention has been paid to integrated solutions, product-service-systems (PSS) and servitization of manufacturing businesses. This attention has provided in-depth knowhow for service provider companies in order to effectively develop, market and deliver their services. Whilst the customer perspective has been central especially in the service marketing literature, the main focus has been on customer satisfaction, perceptions of the provider firm as well as service offering. Actual purchasing practices required to successfully source B2B services have received less attention. This article addresses the knowledge gap in service purchasing by focusing on solution service offerings in B2B and industrial contexts.

The purpose of this paper is to provide an overview of the literature currently available on purchasing integrated business-to-business services and solutions based on the method of systematic review. The aim is to provide theoretical and conceptual grounds as well as suggest topics for future research in this important yet neglected area. In particular, this review will focus on purchasing of contract-based, integrated full-service offerings that are often called 'solution services'. Whilst solution services can go by various names, they share common characteristics: they are complex, represent a critical aspect of the client firms' operations and often cover an extended period of time.

This review systematically identifies scholarly papers published in the crossing of service solutions research and purchasing research. By thorough retrieval methods, an exhaustive sample of 34 relevant papers was compiled. The articles were systematically analyzed with a content analysis method using a combination of a structured coding framework and further emergent codes. In the following section this study briefly presents the B2B solution offerings and industrial services as the main context of research interest. Next, the systematic review methodology is described in two subsections that explain the retrieval process of the article set and the analysis procedures implemented in the review. The findings section begins with an overview and summary of the research and continues with an analysis of the solutions offering aspects. Then, the main research themes identified in the data set; i.e., buyer-supplier relationships, organizational buying behavior, the changing of business models, sustainability, and governance and contracts, are discussed.

The paper concludes with a discussion. Whereas interesting research themes are developing already, the study indicates that a research gap exists in this field of research. Whereas issues of buying and purchasing are often mentioned in producer-focused articles, the number of studies focusing on purchasing as the core topic and using empirical data from the customer side is scant. Finally, the article closes by listing the most critical areas in which new research contributions about solutions purchasing are needed.

2 Background: B2B Solution offerings

Business models based on full-service value propositions (Stremersch et al. 2001) and integrated solutions (Brax and Jonsson 2009, Nordin and Kowalkowski 2010) delivery have spread as a way of doing business in many capital-intensive industries like manufacturing of production systems and vehicles (c.f. Lay et al. 2010). While many companies began developing and providing such business in the 1990's, since the year 2000 this business approach has taken on fast growth and become the dominant business model in many industries, such as in corporate ICT services.

Research on the phenomenon has also grown rapidly (Turunen and Toivonen 2011). This research has mostly focused on the provider side and their perspective, studying the challenges of marketing and providing solution-like product-service hybrids and ser-vices. Several reviews of this literature have been published already (Baines et al. 2009, Nordin and Kowalkowski 2010, Beuren et al. 2013, Lightfoot et al. 2013). Research has also investigated the interface and relational bonds between the provider and the client firm (Tuli et al. 2007, Holmlund 2008, Holmström et al. 2010,

Hakanen and Jaakkola 2012). Also, some studies focusing on the customer side have appeared as well (Ulaga and Chacour 2001).

At the same time researchers and practitioners have recognized the challenges in professional purchasing of increasingly large and technically complex services (e.g. Stremersch et al. 2001, Lindberg and Nordin 2008, Heikkilä et al. 2013) and knowledge-intensive business services (Pardos et al. 2007). While the literature on service purchasing is still scant, more contributions have started to appear recently (Fitzsimmons et al. 1998, Kotabe and Murray 2004, van der Valk 2008). Still, observations on practical cases have indicated that the costs of purchasing and negotiating solution service deals are considerable for both parties (Heikkilä et al. 2013). Purchasing of solutions is demanding because solutions require tailoring and integration of the service to customer's processes (Brax 2005, Brax and Jonsson 2009).

3 Methodology: systematic literature review

The study is based on a systematic literature search (cf. Tranfield et al. 2003) combined with a focused conceptual content analysis approach (see also Eisenhardt 1989, Krippendorff 2004). First, all major databases were searched to build a pool of research articles that focus on solution offerings (based on abstract data).

3.1 Search protocols

The databases searched were EBSCO, Emerald, JSTOR, ProQuest, Sage, ScienceDirect, Scopus, Web of Science and Taylor & Francis. Because the search engines of the databases differ, small technical adjustment was needed in some cases. Generally, the following search rule was implemented to identify literature associated with the solution offerings context:

- "solution offering*" OR "industrial service*" OR "product-service system*" OR "integrated solution*" OR "business solution*" in abstract

Next, within this data pool of identified articles, a second search was performed to identify research that focuses on purchasing such offerings. To begin, articles that contained the word 'purchasing', 'procurement' or 'buying' in the article title or abstract were included:

- buy* OR purchas* OR procur* OR sourc* in abstract

Additional limitations were used where available:

- only Full Text
- Language: English
- Scholarly (peer reviewed) journals only
- Publication type: Academic Journal / Search in journals
- Document Type: Article

The literature searches identified 171 articles; 57 articles had the purchasing related search term in the article title. These 171 articles were inspected based on the abstract by the researchers to ensure the search terms were included, as well as that articles represented a relevant academic discipline (for instance, the term 'integrated solution' is used in chemistry). This resulted in a core sample of 39 articles that fulfilled the search criteria. During the retrieval processes the authors identified six other potentially relevant articles that did not fulfil the formal search criteria of search terms in the abstract fields, and these were added to the sample. For instance, one such article referred to 'sustainable solutions' but was clearly focusing on solution offerings with environment-friendly goals. Thus the content analysis started with a sample of 45 articles. Out of these, 11 articles were excluded for the following reasons: the full-text analysis revealed they did not focus on purchasing or industrial services and solutions; the articles were non-academic; or the role of purchasing in the research design was assessed as marginal during the coding process. Therefore, the size of the final sample was 34 articles.

3.2 Content analysis

The analysis was conducted by two individual researchers working as a team. The analysis was based on alternating periods of collective and delegated analysis tasks. The articles were first read through to get an overview. The full texts were uploaded to Atlas.ti software package to enable computer-assisted shared coding practices. Each researcher conducted their own coding to a separate version of the hermeneutic unit, and these were synced and compared daily.

An initial coding scheme was planned prior to coding and supplemented with further relevant codes as findings emerged and developed during the coding. The initial coding scheme included:

- *Descriptive basic codes* to tag academic discipline, methods, data, research questions, hypotheses, conclusions, comparisons, etc.

- Codes to identify the *relevance of the study from the perspective of purchasing* (purchasing as main focus, adjacent topic, marginal note; studied focal problem, as explaining or causing another problem, not a relevant part of research design).
- *Codes indicating the solution offering context*, namely the specific solution type that was studied (e.g. integrated solution; PSS), and the complexity of the offering being bought (complex, moderate, simple).
- The *perspective* (buyer, seller, combined) and the *purchasing domain* (public, private, PPP) were also marked up.
- Remaining codes focused on the *purchasing related content* and know-how more specifically, identifying various purchasing related sub-themes, steps and stages of the purchasing process, structural aspects of the purchasing function, relational setting (transactional or relational), success factors, and whether frameworks or models were used or produced.

After the first round of coding the expanded coding scheme was assessed and analyses were continued with more detailed research and cross-data comparisons. These analyses were conducted side-by-side with writing the research report, aiming at a presentation that both provides structure to the area, identifies dominance and lack of themes, as well as provides a brief commentary of the research contribution in the key themes.

4 Findings

4.1 Overview of research

The identified 34 papers represented marketing (16 articles), production and operations management (11) or general business and management (7) and their publishing years ranged from 1981 to date. The earlier years were dominated by marketing research whereas general business and management perspectives emerged in 2000's. Despite some early papers in 1990's, the interest on the subject in production and operations management discipline activated in 2010's. Nevertheless, the topic has remained marginal over the years.

Research was published in the following journals:

- Industrial Marketing Management (8 articles)
- International Journal of Operations & Production Management (3)
- International Journal of Production Economics (2)
- Journal of Cleaner Production (2)
- Procedia CIRP (2)
- The following journals were represented by one contribution: Construction Management and Economics; Engineering, Construction and Architectural Management; Industrial & Corporate Change; Information & Management; International Journal Of Computer Integrated Manufacturing; International Journal of Service Industry Management; Journal of Business & Industrial Marketing; Journal of Business Logistics; Journal of Business Research; Journal of Business-to-Business Marketing; Journal of Construction Engineering & Management; Journal of Global Marketing; Journal of Marketing; Journal of World Business; Production Planning & Control; The Asian Journal of Shipping and Logistics; Transportation Journal.

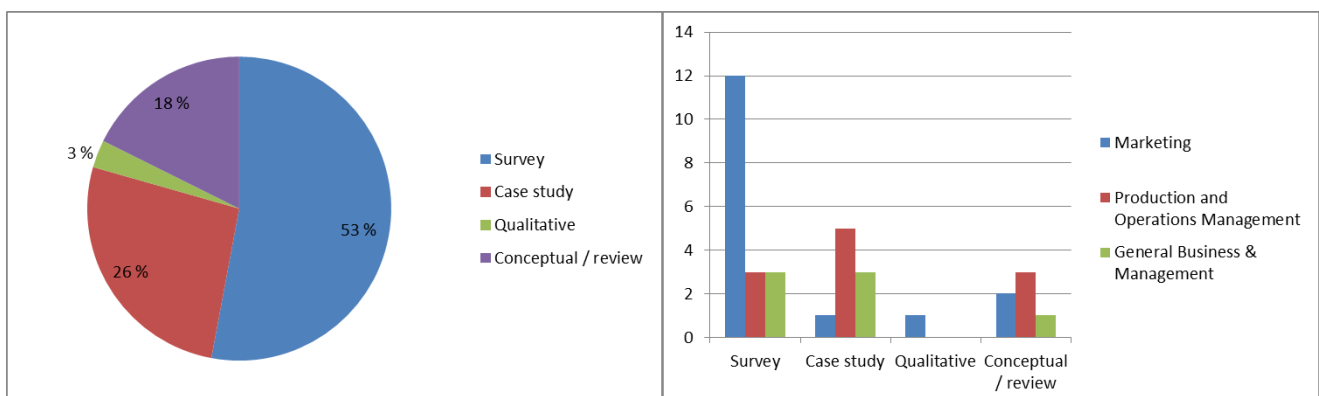


Figure 1a. Use of research designs in the articles. 1b. Breakdown of method choices in the sub-disciplines.

Over half of the studies were based on quantitative survey approaches (see Figure 1). While some studies administered mail surveys, gathering quantitative data through structured interviews was common. Nine papers were based on a case approach, one in a qualitative survey approach, and six studies were either conceptual or based on a literature review. In this limited data set, marketing has a strong emphasis on the survey approach.

4.2 Solution offerings

The most researched category in the identified set of articles is industrial services with 15 studies. The early studies mostly focus on industrial services, and until year 2011, all marketing articles focused on industrial services. The concept of product-service-systems emerges in 2003 (Stoughton and Votta 2003), relatively quickly after the PSS concept appeared in published articles (e.g. Roy 2000). Altogether nine papers focus on PSS.

Clearly, in the early papers the use of terminology differs between the academic disciplines. The offerings discussed under terminology such as industrial services, solutions and systems in marketing tend to be less complex than those discussed on POM studies. The term industrial in early marketing papers does not refer to manufacturing but includes all kinds of business services. Also, outside this set of articles a similar term to product-service-system, written as the product/service system, has been used in marketing in a more limited meaning:

“The main approach is to create a total product/service system. Whatever the customers purchased initially, the company can then present them with related benefits provided by other items in the product line. In this way, they come to realize the existence and value of a total consumption system. McDonald’s no longer sells hamburgers but complete meals...” (Rosenberg and Czepiel 1992, 47–48)

This clearly has influences the validity of the data set; whereas earlier papers on industrial services analyze common business-to-business services, recent studies under this term focus on solution offerings (Lukassen and Wallenburg 2010, Altuntaş and Tuna 2013). Furthermore, the recent studies in marketing use the terms PSS (Everhartz et al. 2014, Gesing et al. 2014) and solutions (Töllner et al. 2011, Oruezabala and Rico 2012). Also, in the more recent studies the concepts are used somewhat similarly across the disciplines. To summarize, in the purchasing studies of the marketing stream, it looks like the focus has shifted from business services characterized by moderate complexity towards complex integrated solutions and PSS. In the field of POM, the interest has stayed on integrated solutions and PSS, but this field has activated in purchasing research relatively recently.

4.3 Domain of purchasing

The analysis distinguished whether the studies focused on sourcing in the private sector or the public sector. As can be seen in Table 1, the majority of 22 articles have the private sector as the sourcing context. This was the case especially in the early marketing studies. The public sector based perspective of public-private partnerships (PPP) is strongly represented in the more recent research (Davies 2004, Chan et al. 2009, Cheung et al. 2010, Datta and Roy 2011, Bankole et al. 2012, Oruezabala and Rico 2012, Roehrich and Caldwell 2012, Datta and Roy 2013, van der Valk and Wynstra 2014). In these studies, a public entity sources a complex or moderately complex solution from a private sector entity. The contract periods can be years or decades, making the private company a partner rather than a supplier. These studies on PPP make a valuable contribution in the study of purchasing solutions, because majority of them are based on in-depth case analysis, and thus provide detailed information about actual sourcing projects with their pros and cons.

4.4 Perspective

As can be expected, majority of the studies take the buyer’s perspective and use data gathered from organizational buyers and decision-makers on the buying side (25 articles). In three papers the dominant perspective is seller’s. Six studies took a combined perspective and obtained data from both the provider and the client. Interestingly, most marketing studies represented the buyer (14 papers out of 16), whereas POM studies often took a combined perspective (4 out of 11). Given the small size of the sample of articles, further statistical analysis is not purposeful. Nevertheless, it seems that in this set of articles the combined perspective increases over time as the interest shifts towards more complex solutions; case research designs are more common in this context because due to their uniqueness, gathering large statistical data sets from complex solutions is difficult.

4.5 Research themes

Based on our analysis regarding the research themes in the articles, five main categories can be formed, including changing business models, buyer-supplier relations, organizational buying behavior, governance and contracting and sustainability. The majority of articles fall under the organizational buying behavior –category, with marketing as the dominant academic discipline. Articles in this category address the buying center structure, involvement of buyers and other organizational members in purchasing decision making, use of referrals in different cultural contexts; in addition differences between goods and services are examined.

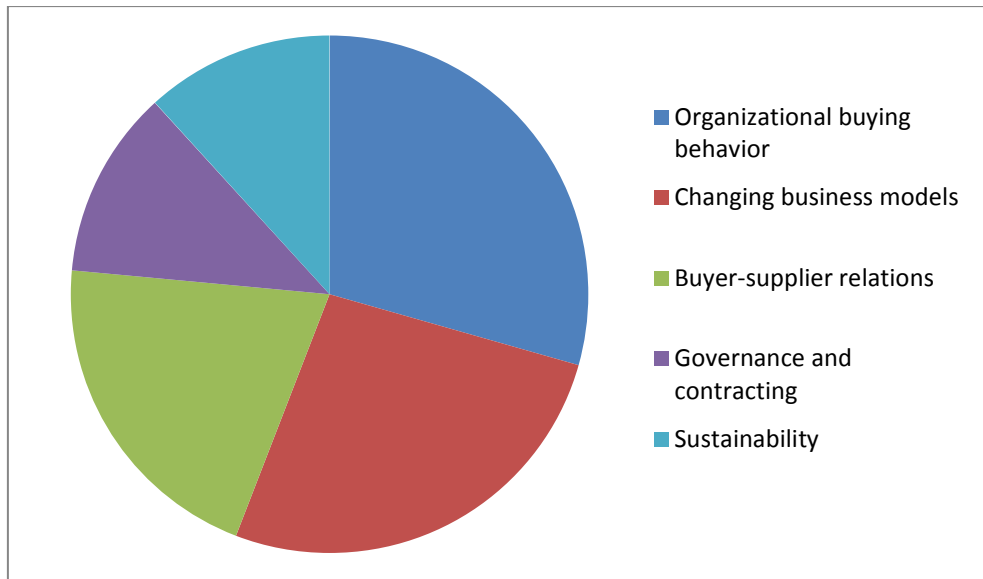


Figure 2. Overview of the distribution of topics in the data set.

Changing business models includes articles focusing on drivers and barriers in purchasing and implementing product-service systems. Additionally, micro- and macro-level studies on PPP adoption are included in this category. Implementation of the through-life perspective can be regarded as an emerging topic. Studies addressing buyer-supplier relations comprise articles focusing on the impact of servitization on buyer-supplier relationships, differentiation of buyer-supplier interaction patterns and service quality aspects linked to relationship characteristics. Studies in the governance and contracting –category address performance based contracting and pricing models. Sustainability has risen as a recent topic including contributions concerning the environmental, as well as economic and social aspects.

4.5.1 Organizational buying behavior

The majority of articles in our sample can be categorized into the “organizational buying behavior” –theme. This stream of research dominates the early contributions in the data set and has become less central in the recent contributions.

Johnson and Bonoma (1981a) study how different buying center dimensions are affected by organizational characteristics and purchasing situation when purchasing capital goods and services. The studied dimensions include: hierarchy levels involved in communications with the buying center; departments and functions involved in decision making; individuals in the buying network; connections between buying group members; and purchasing manager’s communications. Taking a communications view on buying center structure and relations, the authors explore the dynamics of the network behind purchase decision-making in a buyer company. These buying center dimensions are further defined in another Johnson and Bonoma (1981b) study, which examines the purchasing process for industrial services and capital goods in terms of functional involvement and tasks performed by these functions.

In the area of accounting services, Lynn (1987) analyses how firm characteristics including size and the existence of an audit committee, as examples, influence the structure of the buying center and the involvement of participants in purchasing decision-making. Lynn (1987) finds that in small firms the decisions on purchases are made more independently and the CEO is likely to play a substantial role, whereas in larger firms more people are involved in purchasing decision-making.

Also in the context of purchasing financial, informational and promotional services, a study on decision-making processes and the involvement of buyers in different buying situations by Webster (1993) discovers that buyers are showing either medium –or high involvement across all professional service categories. The study finds that buyers are more involved in the decision making process when the company has been using the service for long.

Griese and Kurpitz (1985) analyze the decision-making behavior of firms that are purchasing ICT-systems. Companies they labeled as ‘intensive decision-makers’ were found to be particularly thorough during the various stages of the purchasing process. As part of the decision making process these firms carefully prepared the documentation of requirements, collected information from several sources and consulted various external parties. These firms were found the most active also in further developments of the purchased systems after the actual buy-decision.

Taking the seller’s perspective into service purchasing Lichtental and Shani (2000) include environmental, organizational, group and individual factors to their framework of organizational buying behavior to study client-agency relationships in the advertising industry. They find that sales executives’ knowledge corresponds with majority of the factors included in the OBB framework and suggest that service providers should use this knowledge to tailor their offering.

Money et al. (1998) study the impact of national culture into using word-of-mouth referrals in industrial service purchasing in Japan and US. Roth et al (2004) further analyse the extent to which national culture (based on the firms’

national origin and its location of operation) and network relationships (organization buying experience, types of referral sources used) are related to the use of direct versus indirect purchasing processes for various types of industrial services.

The study by Jackson et al. (Jackson et al. 1995) resonates with the OBB theme, as it surveys differences and similarities between goods and services from organizational buyer perspective in various industries. Goods and services are found to differ across a range of dimensions; as main differences, the authors find that evaluation of quality is more difficult for services than it is for goods, services require more collaboration between the buyer and the seller and that different people are involved in the purchasing process for goods and services.

The most recent study in the OBB theme takes place in the context of capital goods, as Töllner et al. (2011) conceptualize the criteria for a customer solution from buyer perspective. They analyze whether the relevance of solution criteria differs across different buying center members (users, buyers and deciders). Töllner et al. (2011) find that criteria for a customer solution consist of requirements definition, customization and integration, deployment and post-deployment support; in addition, signaling (i.e. seller showing commitment and preparing an initial concept suggestion already during the early stages of the process), co-ordination and time management are included. The results confirm the suggested differences in criteria relevance across different buying group members, for example users are more interested in the customization of solutions, whereas buyers are strongly interested in the requirements definition and signaling activities.

4.5.2 Buyer-supplier relations

The theme of buyer-supplier relations soon followed the OBB theme and contributions in this theme still appear regularly. Buyer-supplier relations and their characteristics in a servitized environment are studied by Bastl et al. (2012) and Saccani et al. (2014), who focus on the impact of servitization in buyer-supplier relationships in terms of information exchange, operational linkages, legal bonds and adaptations. Further, Saccani et al. (2014) associate different service types with buyer-supplier relationship characteristics, using a framework similar to the one used by Bastl et al. (2012). Also Wynstra and van der Valk (2006, van der Valk and Wynstra 2014) raise the issue of linking service categories with different buyer-supplier interaction patterns. They emphasize differentiated interactions as the foundation for successful service exchange and design. Interaction patterns reflect the underlying usage situations; therefore differentiated approaches are needed for purchasing different services as well as managing service suppliers.

Relationship quality is discussed in three papers. Panigyrakis and Veloutsou (Panigyrakis and Veloutsou 1999) study the multiple internal and external relationship interfaces employed by a brand manager in a buyer company in terms of time allocation as well as importance and quality of the relationship. Focusing on buyer-supplier relationship building, Barry and Doneu (2011) study relationship quality in cross-cultural setting. Their main finding is that buyers tend to emphasize trust, commitment and satisfaction: when these factors are present in the relationship, the buyer is more likely willing to continue the relationship with the service provider in question. Buyers in collectivist cultures emphasize relational factors more than buyers in individualistic cultures, who are more inclined towards economic factors. In any case, relational investments on the part of the service provider are called for the establishment and retention of long-term buyer-supplier relationships. The three relationship characteristics of trust, commitment and satisfaction are also in focus in the study by Homburg and Garbe (1991). These authors conclude that relationship trust, commitment and satisfaction are driven by service quality, in particular the process-related quality.

4.5.3 Changing business models

Articles focusing on changing business models highlight drivers and barriers in purchasing and implementing product-service systems. An early article in this stream by Menon et al. (1998) looks at supplier selection criteria in the context of third-party logistics business models. The article by Davies (2004) is a classic article that addresses the migration of manufacturers towards 'down-stream' towards the end-user as they provide complete solutions. Stoughton and Votta (2003) discuss opportunities and barriers related to implementing a chemical management system as PSS, noting in particular that successful implementation requires aligning incentives between the service provider and the buyer. In addition, buyer's capability to assess total costs related PSS implementation is raised. Gesing et al. (2014) find that over-dependence on a supplier, loss of know-how and increased risk may constitute barriers towards PSS implementation in a buyer company; on the other hand, buyer company capabilities, resources, management style as well as underlying processes constitute main drivers for make-or-buy decisions in PSS context (Everhart et al. 2014).

In the context of changing business models, there are a number of articles discussing public-private partnerships. On macro level, Cheung et al. (2010) 2010 study negative and positive factors related to adopting PPP in procuring large public works and make a comparison between Hongkong, Australia and UK, finding that the attractiveness of PPP related to both efficiency and economic-driven factors, however emphasis of these factors varies between the countries studied. Another comparison study (Chan et al. 2009) discusses PPP drivers in China and Hongkong, noting that economic drivers are rated higher in China whereas in Hongkong, efficiency related drivers dominate. The capability of PPP to provide an integrated solution for public/infrastructure services was however deemed as the most important driver in both countries. On micro level, Roehrich and Caldwell (2012) investigate the implications of PPP provision from supplier perspective, emphasizing the need to unbundle the service offering for the sake of better risk management

and contract fulfillment. However, the effect of this unbundling may deem more expensive for the buyer, who is left with the challenging task of evaluating costs related to different service bundling/unbundling solutions and related contracting options. Through-life incentives are suggested as one alternative for driving mutually beneficial PPP arrangements. The importance of taking the through-life perspective into evaluating the feasibility of a PSS business model is also emphasized by Bankole et al. (2012) who conceptualize PSS through affordability in a multi-party setting.

4.5.4 Governance and contracting

Governance and contract issues are important aspects of complex solutions and addressed in most of the studies to some extent, whereas four articles specifically focus on this topic. Relationship governance aspects concerning complex product-service-systems are discussed by Roehrich and Lewis (2011), whose model describes the interrelationships between relational and contractual governance in an inter-organizational setting. In the domain of contracting, Datta and Roy (2011) conceptualize performance based-contracting in operations strategy in a framework comprising customer and service provider operations, contract definition and service delivery. Establishing a customer-solution team, understanding customer processes and inventory ordering pattern are found to be essential factors in enabling successful delivery of performance-based contracts. In a later study, the authors set up three alternative risk sharing scenarios for a performance based contract in outsourcing complex service solutions in the defense industry (Datta and Roy, 2013). Lukassen and Wallenburg (2010) focus on pricing and contracting in third-party logistics services by making an article review on industrial and logistics services in this context: based on literature, service pricing is found to have an effect on the relational outcomes in the respective relationships between buyers and service providers.

4.5.5. Sustainability

Sustainability is the most recent addition to the themes in the set of articles, featured in four studies. In the healthcare sector, Oruezabala et al. (2012) approach sustainability in public-private partnerships by studying sustainable procurement expectations that purchasing managers have for service providers. Sustainable procurement is linked to evaluating the supplier offering, optimizing the supply base, increased expectation on supplier innovations and increased need to evaluate total costs related to the purchased solution.

Bratt et al. (2013) look into green purchasing and criteria development in public procurement context. The authors evaluate the process for criteria development in terms of strengths, including the transparency of the process and documentation as well as weaknesses, including short-sightedness of the applied perspective and lack of clear definitions of objectives related to sustainability.

Altuntaş and Tuna (2013) focus on sustainability from environmental perspective by examining supplier evaluation criteria in logistics services; based on literature, the authors conceptualize environmental performance criteria for evaluation of on one hand, green real estate and green logistics services and on the other hand, green supplier evaluation and improvement of logistics services.

Discussion

Despite the number of articles was much smaller than what was anticipated in the beginning of the study, the review points towards several important insights.

The first conclusion from the study is that the extent to which purchasing of solutions has been studied does not correspond to the scale of solutions business in practice. Furthermore, the studies that exist so far remain highly fragmented. Therefore this study has identified a promising field for researchers to explore.

The second conclusion is that the leading purchasing and supply chain management journals have not reacted to the increasing activity in the context of solution offerings and product-service systems. A large part of the studies in the sample identified by this study represent the perspective of marketers and the marketing discipline. What is clearly missing in this area so far are the implications for the purchasing function, for example in terms of evaluating solution alternatives based on through-life costing, creating new supplier evaluation criteria, conducting the sourcing process including requirements definition and managing service providers capability during extensive contract periods. Thus, there are ample opportunities for purchasing scholars to enter this area of research.

One peculiarity is that none of the widely-cited 'classic' articles in the solutions literature made its way to the data set. For instance, 'Managing the transition from products to services' by Oliva and Kallenberg (2003) has over 1100 citations; this article does not even contain the word 'buy'. 'State-of-the-art in product-service systems' by Baines et al. (2007) has over 700 citations and mentions buyer-seller relationship in one sentence. All widely-cited articles focus on the development of integrated solutions (Brady et al. 2005, Davies et al. 2006, Windahl and Lakemond 2006, Brax and Jonsson 2009) and product-service-systems (Mont 2002, Tukker 2004, Aurich et al. 2006, Mont and Tukker 2006, Neely 2008). In other words, the searched streams of literature are thoroughly dominated by the provider's perspective.

As the third conclusion, this study suggests that servitization scholars with access to solution provider companies investigate the buyer's perspective. In order to produce novel contributions of highest possible relevance, purchasing and servitization scholars should collaborate by developing joint research projects.

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Appendix. Overview of the literature set.

Source, Discipline	Sector	Industry	Persp.	Focus	Methodic approach	Main data source	Main research theme	Solution term	Offer complexity
<u>Johnston and Bonoma (1981a), <i>The Buying Center: Structure and Interaction Patterns</i></u>									
Marketing	private	multiple	buyer	focal	Interview-based survey	241 interviews of respondents involved in purchasing decision making , 31 firms in multiple industries	<i>Organizational buying behavior</i>	industrial services	simple
<u>Johnston and Bonoma (1981b), <i>Purchase Process for Capital Equipment and Services</i></u>									
Marketing	private	multiple	buyer	focal	Interview-based survey, (qualitative)	241 interviews of respondents involved in purchasing decision making , 31 firms in multiple industries	<i>Organizational buying behavior</i>	industrial services	simple
<u>Griese and Kurpicz (1985), <i>Investigating the buying process for the introduction of data processing in small and medium-sized firms</i></u>									
POM (ICT)	private	Manufacturing logistics/services	buyer	focal	Survey (questionnaire)	Small and medium-size firms; 69 respondents,; companies buying data processing system	<i>Organizational buying behavior</i>	integrated solution	complex
<u>Lynn (1987), <i>Identifying Buying Influences for a Professional Services: Implication for Marketing Efforts</i></u>									
Marketing	private public	Accounting	buyer	focal	Survey (questionnaire)	258 business firms; CEOs, CFOs and controllers	<i>Organizational buying behavior</i>	industrial services	moderate
<u>Webster (1993), <i>Buyer Involvement in Purchasing Success</i></u>									
Marketing	private	unspecified	buyer	focal	Survey	129 industrial firms, respondents with the most influence and control over purchasing decisions	<i>Organizational buying behavior</i>	industrial services	moderate
<u>Jackson et al. (1995), <i>An Empirical Investigation of the Differences in Goods and Services as Perceived by Organizational Buyers</i></u>									
Marketing	private	multiple	buyer	focal	Survey	236 questionnaires mailed; respondents	<i>Organizational buying behavior</i>	industrial services	moderate
<u>Menon et al. (1998), <i>Selection criteria for providers of third-party logistics services: An exploratory study</i></u>									
POM	private	Transportation	buyer	focal	Survey (questionnaire)	41 logistics services users in the United States	<i>Changing business models</i>	industrial services	moderate
<u>Money et al. (1998), <i>Explorations of National Culture and Word-of-Mouth Referral Behavior in the Purchase of Industrial Services in the United States and Japan</i></u>									
Marketing	private	Mixed business services	buyer	focal	Interviews	434 purchases made by 48 service buying companies, decision makers interviewed, both US and Japanese companies in dataset	<i>Organizational buying behavior</i>	industrial services	moderate
<u>Panigyrakis and Veloutsou (1999), <i>Brand managers' relations with industrial service providers in pharmaceutical and other companies</i></u>									
Marketing	private	Pharmaceuticals consumer goods	buyer	focal	Survey (structured interview)	162 product and group product managers working for 48 medium to large companies in Greece	<i>Buyer-supplier relations</i>	industrial services	moderate
<u>Homburg and Garbe (1999), <i>Towards an Improved Understanding of Industrial Services: Quality Dimensions and Their Impact on Buyer-Seller Relationships</i></u>									
Marketing	private	Generic	buyer	focal	Survey	Pre-study interviews: purchasing managers from 20 companies; questionnaire: 177 in senior positions responsible for purchasing, Germany	<i>Buyer-supplier relations</i>	industrial services	mixed
<u>Lichtenthal and Shani (2000), <i>Selection criteria for providers of third-party logistics services: An exploratory study</i></u>									
Marketing	private	Advertising	seller	adjacent	Survey	50 top advertising agencies in US	<i>Organizational buying behavior</i>	not specified	moderate

<u>Stoughton and Votta (2003), Implementing service-based chemical procurement: lessons and results</u>									
General business	private	Chemicals	buyer	adjacent	Case study	15 chemical using firms over 5 years of time	<i>Changing business models</i>	PSS	complex
<u>Davies (2004), Moving base into high-value integrated solutions: a value stream approach</u>									
General business	Multi / PPP	Capital goods	seller	adjacent	Conceptual analysis with case examples	5 cases companies; up to 10 senior managers interviewed per firm	<i>Changing business models</i>	Integrated solutions	complex
<u>Roth et al. (2004), Purchasing processes and characteristics of industrial service buyers in the U.S. and Japan</u>									
General business	private	Unspecified	buyer	focal	Survey (structured interview)	434 purchases made by 48 service buying companies, decision makers interviewed, both US and Japanese companies in dataset	<i>Organizational buying behavior</i>	industrial services	unspecified
<u>Wynstra et al. (2006), An application-based classification to understand buyer-supplier interaction in business services</u>									
Marketing	private	N/A	buyer	adjacent	Conceptual analysis	Not applicable	<i>Buyer-supplier relations</i>	industrial services	moderate
<u>Chan et al. (2009), Drivers for Adopting Public Private Partnerships—Empirical Comparison between China and Hong Kong Special Administrative Region</u>									
General business	Multi / PPP	Multiple	multi	focal	Survey	86 organization members involved in PPP projects in China and Hong Kong; compares with UK	<i>Changing business models</i>	integrated solutions	complex
<u>Cheung et al. (2010), Suitability of procuring large public works by PPP in Hong Kong</u>									
General business	Public	Infrastructure services	buyer	focal	Survey	95 respondents in Hong Kong and 80 respondents in Australia (respondents from the public, private and other sectors)	<i>Changing business models</i>	Integrated solutions	complex
<u>Lukassen and Wallenburg (2010), Pricing Third-Party Logistics Services: Integrating Insights from the Logistics and Industrial Services Literature</u>									
Marketing (IMP)	private	Transportation	multi	adjacent	Literature review	32 articles on logistics services pricing and 29 articles on industrial services pricing	<i>Governance and contracting</i>	industrial services	moderate
<u>Roehrich and Lewis (2010), Towards a model of governance in complex (product-service) inter-organizational systems</u>									
General business	private	N/A	buyer	focal	Conceptual analysis	No data; buyer-seller relationship as unit of analysis	<i>Governance and contracting</i>	PSS	complex
<u>Barry and Doney (2011), Cross-Cultural Examination of Relationship Quality</u>									
Marketing	private	aircraft services	buyer	focal	Survey	202 buyers in commercial airlines in 42 countries	<i>Buyer-supplier relations</i>	Industrial services	moderate
<u>Datta and Roy (2011), Incentive issues in performance-based outsourcing contracts in the UK defence industry: a simulation study</u>									
POM	Public / PPP	Defense and aerospace	multi	focal	Systematic review + exploratory cases	Two case studies; both case firms provide for Ministry of Defence, UK; 15 interviews	<i>Governance and contracting</i>	PSS	complex
<u>Töllner (2011), Customer solutions in the capital goods industry: Examining the impact of the buying center</u>									
Marketing	private	Capital goods industries	buyer	focal	Case study	17 interviews with users, buyers and deciders in 9 customer firms	<i>Organizational buying behavior</i>	other solution	complex
<u>Bastl (2012), Buyer-supplier relationships in a servitized environmentAn examination with Cannon and Perreault's framework</u>									
POM	private	Aerospace and defence	combined	adjacent	Case study	3 case firms (2 suppliers, 1 buyer); total 16 interviews with respondents from all firms	<i>Buyer-supplier relations</i>	integrated solution	complex

<u>Oruezabala and Rico (2012), The impact of sustainable public procurement on supplier management — The case of French public hospitals</u>									
Marketing	Public / PPP	Healthcare	buyer	focal	Qualitative study, interviews	15 hospitals; three experts interviewed to develop interview guide; then one interviewee per hospital	Sustainability	sustainable solutions	complex
<u>Roehrich and Caldwell (2012), Delivering integrated solutions in the public sector: The unbundling paradox</u>									
POM	Multi / PPP	Healthcare	multi	focal	Longitudinal multi-case study	2 PPP hospital cases; 16 interviews with the solutions provider and 14 interviews with NHS Trusts	Changing business models	integrated solutions	complex
<u>Bankole et al. (2012), Product-service system affordability in defence and aerospace industries: state-of-the-art and current industrial practice</u>									
POM	Multi / PPP	Defense and aerospace	multi	focal	Case study	Ministry of Defence, UK, manufacturers and suppliers	Changing business models	PSS	complex
<u>Walker and Brammer (2012), The relationship between sustainable procurement and e-procurement in the public sector</u>									
POM	Public	multiple	buyer	focal	Survey	283 public procurement practitioners in 20 countries	Sustainability	generic	unspecified
<u>Altuntas and Tuna (2013), Greening Logistics Centers: The Evolution of Industrial Buying Criteria Towards Green</u>									
POM (logistics)	Private	Logistics	buyer	focal	Literature review / Conceptual	Development of framework	Sustainability	Industrial service	moderate
<u>Bratt et al. (2013), Assessment of criteria development for public procurement from a strategic sustainability perspective</u>									
General business	Public	Transportation Building maintenance	buyer	focal	Case study	2 criteria development processes in a Swedish governmental body for green public procurement, 6 interviews of participants in the process	Sustainability	PSS solutions	moderate
<u>Datta and Roy (2013), Incentive issues in performance-based outsourcing contracts in the UK defence industry: a simulation study</u>									
POM	Public / PPP	Defense and aerospace	seller	focal	Model development	Contract involving a customer, OEM, and suppliers	Governance and contracting	PSS	complex
<u>Everhartz et al. (2014), Identifying and Analyzing the Customer Situation: Drivers for Purchasing Industrial Product Service Systems</u>									
Marketing	private	Automation	buyer	focal	Survey	Buying center members in 247 companies	Changing business models	industrial PSS	N/A
<u>Gesing et al. (2014), Are IPS2 always a Solution? Obstacles towards Buying Industrial Product Service Systems</u>									
Marketing	private	Industrial products	buyer	focal	Survey	226 participants from 83 companies buying mere products and 143 companies purchasing IPS	Changing business models	industrial PSS	N/A
<u>Saccani et al. (2014), Investigating the linkages between service types and supplier relationships in servitized environments</u>									
POM	private	Manufacturing	buyer	focal	Multi-case study	4 case companies (buyers) and their suppliers	Buyer-supplier relations	PSS	complex
<u>van der Valk and Wynstra (2014), Variety in business-to-business services and buyer-supplier interaction</u>									
POM	Public / PPP	Transportation	buyer	focal	Embedded case study	Purchase of cleaning services by Netherlands Railways (NS) from two suppliers; 21 interviews	Buyer-supplier relations	N/A	moderate

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Revisited in the perspective of Hill's views on services, with some insights on EU and France

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First draft / preliminary results

Abstract:

A new definition of service has been proposed by Hill (1999) and endorsed by SNA and BOP last updates. The paper studies its consequences for industrial classifications, such as ISIC, and the respective shares of goods and services producing sectors. The first section reminds the main characteristics of the new definition. The second section scrutinises the list of sectors of ISIC Rev. 4 and 3.1 in order to show within which category (goods or services producing) the headings falls. The major changes concerns what may be called manufacturing services and information goods producing sectors, the former being previously included in goods and the latter in services-producing. The third section proposes a measure of the share of each broad category for EU 27 (2008–2011) and France (1995–2011). The tertiarisation trend, is preserved, even if several significant differences appear with standard presentations. Manufacturing services, at present added to services-producing by far supersede Information goods, added to goods-producing.

JEL codes: L8; E01;

Keywords: tertiarisation; industrial structures; services

Since many decades in almost all countries, there has been a steady trend toward tertiarisation (services-producing), whether measured through the share of employment or value added (Gadrey 2003, Memedovic Lapadre 2009). Obviously this trend is fairly depending upon the definition of the service, which induces in turn that of services producing activities (Daniels Bryson 2002). For instance there has been a debate on whether public utilities, such as power generation should be considered as services industries or not. Nonetheless, even if public utilities were not entirely included in services industries, the aforementioned trend would not be altered, but it could be so with a more radical change in the service definition. Yet, it happens that an innovative interpretation of what a service is, was popularised by Hill 1999 and was endorsed by SNA and BOP last update (Broussolle 2014, SNA 2009, IMF 2009). This new approach considers that since services cannot be isolated from the producer or the consumer, they are mainly characterised by the impossibility of establishing ownership rights over them.

This move has two main consequences for the tertiarisation trend: on the one hand several activities formerly included in goods producing industries, could be viewed as services, when they operate on goods that they don't own, i.e. processing goods for third parties that remain their owners. These circumstances may lead to a new category of "manufacturing services" (IMF 2009).

On the other hand several activities, which were formerly viewed as services industries, could be re-categorised in goods producing. It is the case for all traditional services activities which output may be subject to ownership rights, such as film production, software and several Knowledge Intensive Business Services (KIBS). Those industries are producing what SNA 2008 designates as knowledge-capturing products.

The accurate consequences of the new perspective, either on the classification of services activities or on the tertiarisation trend, have yet to be drawn. They might prove to be significant. The purpose of the paper is to suggest a first assessment of those potential changes, which may influence several aspects of economic policies related with the deindustrialisation issue.

It is at least a major subject of concern in the euro area, for instance the European Commission Europe 2020 strategy aims at increasing to a 20% the share of industry in EU GDP, if not in all developed countries. One aspect is the extent of deindustrialisation, since quite a few services producing activities may be seen as goods producing. What is customarily called deindustrialisation could rather be a shift in goods-producing sectors, when new ones are included. Another aspect concerns international trade, whether on a strategic level or on an academic one. On the strategic level, the issue deals with what economic sectors do increase exports within the current transactions account? Activities which output is prone to ownership rights may be great contributors; consequently they should be supported, even if they are not included in the long-established manufacturing group. On the academic level, when the services activities are better delineated, their poor cross border trade capacities is strengthened, since several traditional viewed services industries

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that were actually major exporters, shift to goods producing. Hence, the already dominant share of goods-producing sectors in exports anew increases.

The paper is structured as follows. First it will briefly remind the main aspects of the new perspective on services. Second, it will draw its consequences on the categorisation within goods-producing and services-producing industries in the perspective of the International Standard Industrial Classification (ISIC, Rev. 3 and 4). The actual purpose of this study will be to suggest evolutions, consistent with the new approach on services. That process will show which broad sector would expand or shorten. The last section will use detailed data to measure the effects of the new reorganisation on the tertiarisation of employment and value added.

1 The new service definition and its issues

The new definition of service departs to a certain extent from familiar views, which are mostly grounded on intangibility (materiality) and non-storability, whereas goods are material or physical entities⁶²:

It is especially centred on the fact that services are flows (Hill 1977), which induces that they are not separate entities from the provider or the recipient, thus they cannot be traded separately from their production. Consequently no ownership rights may be established over services. This innovative view owes much to Hill's works (1999), it is endorsed by the manuals of the National Accounts (SNA 2009) and of the Balance of Payments (IMF 2009) (see box n°1).

The new view have several significant upshots, the major one is that some industries, commonly regarded as services-producing are mainly providing goods (Hill 1999), a fact which may appear fairly disturbing. Conversely several manufacturing classified industries are producing services. As mentioned, the very effects of those elements have yet to be drawn, both on industrial taxonomies and on the measurement of the industrial sectors.

Box n°1: Services enhanced definition, original in SNA (2009) manual

Services § 6.17

"Services are the result of a production activity that changes the conditions of the consuming units, or facilitate the exchange of products or financial assets. (...) services are not separate entities over which ownership rights can be established. They cannot be traded separately from their production. By the time their production is completed, they must have been provided to the consumers."

Originals 6.208

"The production of books, recordings, films, software, tapes, disks, etc. is a two-stage process of which the first stage is the production of the original and the second stage the production and use of copies of the original. The output of the first stage is the original itself over which legal or de facto ownership can be established by copyright, patent or secrecy. (...)"

Knowledge capturing products

6.13 – *"(...) some service-producing industries may produce products that have many of the characteristics of goods. For convenience, the products of these industries are described in the SNA as **knowledge-capturing products**".*

6.22 – (...) *"The outputs of these industries, over which ownership rights may be established, are often stored on physical objects (whether on paper or on electronic media) that can be traded like ordinary goods. They have many of the characteristics of goods in that ownership rights over these products can be established and they can be used repeatedly. (...)"*

The new perspective carries two main consequences for the categorisation of activities: firstly it provides a substance to the concept of manufacturing services and secondly it raises doubts on the categorisation of the output of traditionally viewed service-producing activities. Altogether thus, it prompts for a reorganisation of the customary services vs. goods producing separation in industrial taxonomies.

1.1 Manufacturing services

Manufacturing like industries may provide services in several circumstances, even as their main output. This possible occurrence is well-recognised for repair services, but the new perspective on goods and services goes further on. Every time an economic unit, even customarily ranked within goods-producing, performs an activity for third parties, on goods which it does not own, it is providing a service. Indeed in these circumstances its output may not be isolated from the producer or the recipient and, as such, it is not prone to ownership rights. This derives from the fact that the manufacturing operation is performed on materials not belonging to the economic unit, which is thus an essential

⁶² Selon la définition qu'en donne l'INSEE, « relèvent de l'industrie les activités économiques qui combinent des facteurs de production (...) pour produire des biens matériels destinés au marché ». Les biens sont des « objets physiques pour lesquels il existe une demande, sur lesquels des droits de propriété peuvent être établis (...) ».

feature. As it may be understood, it is an extension of the repair case. This approach is already applied in the BOP with the treatment of goods sent or received from abroad for processing (IMF 2009). Prior to 2008, that activity was regarded as exports of goods and when coming back, as imports. According to the new treatment, when there is no ownership change between the principal and the agent, these movements shift to services transactions. Similar views have somehow been also applied in ISIC rev. 4. Consequently when a manufacturing like unit provides that kind of service as its main activity, it should be included within the services sector, for instance in a manufacturing services heading.

An analogous reasoning also applies to construction activities, among which several are usually performed as sub-contractors, on third parties owned materials (see next section).

1.2 Information goods: knowledge capturing products, original and copies

The new information economy significantly relies on dematerialisation and delivery through New Information and Communication Technologies (NICT).

Because the output of several commonly viewed services-producing industries may be digitalised, it can be delivered separately from their producer and stored. Furthermore it becomes possible to apply over it ownership rights. In order to take into account that evolution, since 1993 the SNAs have acknowledged for a category of products bearing both characteristics of goods and services (box n°1), which the 2008 update calls *Knowledge-Capturing Products*. Subsequently several traditionally viewed services-producing industries are deemed to produce goods-like products. In fact they are true goods as Hill's (1999) paper convincingly demonstrates by referring to the concept of *original*:

An *original* is the result of a creative process that produces an intangible entity. It may be copied as many times as necessary, without being altered. Enduring originals, such as a patent or an architect's plan, may be viewed as some kind of new assets. Therefore, if used over a long period it is considered as an intangible asset by SNA. An original is definitely a good (Hill 1999 p. 440), "An original is the archetypal immaterial good. It is a good because it is an entity over which ownership rights can be established and which is of economic value to its owner". SNA acknowledges for this fact since SNA 2008 (§ 6.208, see also 10.99 sq.). It is worth underlining that the original is not the physical matrix of CD, film... the original is the very intellectual production that can be stored on some device (Hill 2003). Copies are undoubtedly goods as well, but as every goods they can be sold outright or made available under a license. When sold outright, a copy is a good, to be considered a [fixed] asset if used in production for more than one year. A copy purchased with a license may still be regarded as a commodity ([fixed] asset) if according to SNA "the licensee assumes all the risks and rewards of ownership copies (SNA 2009, § 10.100)". The manual suggests that the only situation when a license does not fall within the asset/ commodity case is when it does not involve a long-term contract. In these circumstances, the transaction relates to a flow of services.

Several services-producing viewed industries can produce originals, thus goods. Those originals, as well as their copies, can be sold outright as goods (for instance database sale), or through subscription as services (for instance database instant access). When economic units are customarily producing originals or assets as primary output, they should be categorised within goods-producing units, even if they are commonly viewed as services-producing. For example, since most software is commonly sold outright or through long-term access contracts, where ownership may be viewed as transferred, they are not services. Hence, the software programming industry should no more be included in the services sector.

Finally let us underline that although any manufacturing activity maybe turned into a services one, depending on the contractual relations between the producer and the customer, true services-producing may not be turned into goods-producing.

Next section will study what are the consequences of those innovations on industrial classifications.

2 A new interpretation of industrial taxonomies

This section points out the main consequences of the new definition of the service for the categorisation of goods and services producing sectors. The analysis covers both ISIC rev. 3 and 4 since a major revision has taken place in 2008, which has led to a break in their presentation. It gives an occasion to pinpoint the changes that shed a better light on services activities, even if the partition between goods and services producing is not their main purpose (Rev. 3.1 p. 10, Rev. 4 p. 9).

2.1 General principles of the reorganisation

In accordance with the views presented in the previous section, any goods-producing activity, which output is, on a main and usual basis, neither separable from the provider, nor from the recipient, maybe classified within the services-producing sector. This especially concerns manufacturing like activities, which are carried out as subcontractors for third parties on not owned, or more commonly described as not self-produced, materials. Conversely, any activity over which output, on a main and usual basis, ownership rights maybe established, i.e. which output is separable either from the producer or the consumer, is classified within the goods-producing sector, whether services like or not. This especially concerns information activities, usually classified within services producing.

As stated in ISIC manuals (Rev. 3 and 4): “Manufacturing units may process materials or may contract with other units to process their materials for them. Both types of units are included in manufacturing.” (UNO 2002 p.69, UNO 2008 p. 85). Thus unfortunately manufacturing entries are hardly ever established according to the criteria whether the activity is carried out on products belonging to third parties or not. Moreover, in the accompanying commentaries that characteristic is not systematically mentioned, even when industries may be concerned, for instance with textile or wearing apparels, still some hints are provided. Be that as it may, Rev. 4 introduces improvements to distinguish proper manufacturing activities, from manufacturing services, or else services related and incidental. Those improvements partly take into consideration the new advocated service perspective. For instance, as a major step towards the recognition of a broad manufacturing services heading, all specialised repair activities are now separately classifiable⁶³. Following the same orientation, contrary to the Rev. 3.1 presentation, that was customarily incorporating services related activities --or installation when carried out as a special activity⁶⁴, with their goods-producing group, in the Rev. 4 they are now quite often detached in a dedicated sub-heading. For instance: *support activities to agriculture and post-harvest crop* activities, as well as *forestry* (#024), or *Remediation activities and other waste management services* (#3900) are separately gathered. In the division 09, *Mining support service activities* are also better delineated and enhanced, than in the previous Rev 3.1 sub-division.

Finally, even if ISIC utterly states that it is not interested in the goods-services producing categorisation, the last revision render visible the services that were earlier incorporated within goods producing sectors.

Still it is worth noticing that whereas ISIC delineation, between an activity and its maintenance and repair corresponding one, depends on the results of the output being a new product or not⁶⁵, the rationale of this paper relies on the fact that the former produces commodities and the latter services. What is at stake thus is the possibility or not to establish ownership rights on the output, or alternately stated if the operated materials are or not self owned. This principle may need some explanations particularly with installation activities, they will be provided, in the appropriate section.

2.2 A look at the main headings of ISIC that deserve discussion

Before scrutinising the main sections, let us begin with three general considerations:

First, a usual grouping of goods-producing and services-producing sectors, agglomerates agriculture, mining, manufacturing, and construction, in the first class; and all other industries, including government, in the other one (Kutscher & Personick 1986, Memedovic & Lapadre 2009). Let us notice that this way of doing allocates utilities to services-producing, whereas many continental studies include them in goods-producing (Schettkat & Yocarini 2006, Demmou 2010, Shreiber & Vicard 2011). Other studies of deindustrialisation do not use a goods vs. services presentation (Montresor Vittuci-Marzetti 2011). This debate will be settled below when tackling with utilities.

Second, albeit Agriculture, forestry and fishing may include services activities, whether concerning service activities incidental to agriculture as mentioned in the ISIC manual, or services activities according to the new service approach, due to available data, the analysis focuses on industry and services sectors.

Third, even if the main discussion is based on ISIC Rev. 4 ordering and presentation, the text also addresses ISIC Rev. 3.1, when it is useful and illuminating. Two tables summarises how headings may be categorised, thus gathered and reorganised.

B Section: Mining and quarrying

This section is definitely belonging to goods-producing; nevertheless some of the technical operations, particularly related to the extraction of hydrocarbons, may be carried out for third parties by specialised units as a manufacturing service. They are mainly grouped in division 09 (*Mining support service activities*).

C Section: Manufacturing

The bulk of the section obviously rests with goods-producing, with the exception of some divisions. They concern manufacturing or repair and maintenance services, as for instance *metal working service activities* (#259) or *Repair and installation of machinery and equipment* (#33, see table n°). *Installation of industrial machinery and equipment* (#332), is a service when the installer is not the manufacturer of the equipment, or when being a subsidiary/ affiliate of the manufacturer, installation is its main activity. It is the case of the specialised installation heading.

Printing and reproduction of recorded media (#18) and Printing and service activities related to printing (#181) included in Manufacturing are evoked with section J Information and communication.

⁶³ In ISIC. Rev.3.1 « Activities of units primarily engaged in maintenance and repair of industrial, commercial and similar machinery and equipment are, in general, classified in the same class of manufacturing as those specializing in manufacturing the goods » (UN 2002 p.).

⁶⁴ “Assembly and installation of machinery and equipment in mining, manufacturing, commercial or other units, when carried out as a specialized activity, is classified in the same class of manufacturing as manufacture of the item installed.” (UN 2002 p.)

⁶⁵ “As a general rule, the activities in the manufacturing section involve the transformation of materials into new products” (UNO 2008 p. 86)

D & E sections: Utilities

The traditional view of utilities covers power and water supply and related activities, which quite often are included in services-producing.

However, the production of electricity, gas, steam and air conditioning is not to be considered as a service provision. It is not because electricity... could be regarded as a material entity, contrasting with “immaterial” services, but because electricity... are separable from their producer or recipient and thus prone to ownership rights. It is also worth noticing that their production and consumption are distinctive operations, whereas, for instance, it is not so in the case of telecommunications services. In fact, only their delivery or long-distance transport is a service activity. However this dimension of the activity is seldom purposely identified. As the ISIC manual puts it, “the network [*permanent infrastructure*] dimension of those activities is not decisive” (UN 2008 p. 165). Yet long distance transport of fluids through pipelines is captured in division *pipeline transport activities* (#4930). Since European directives concerning network industries, such as railways, postal services or power generation, command to isolate the transportation from the production activities, it should become more and more easy to capture the services share of the output. As a matter of fact, the European classification, NACE Rev.2, retains four sub headings to transport and delivery of gas and power (Table n°3).

For similar reasons *water supply; sewerage, waste management and remediation activities* (Table n°1) are not to be regarded globally as service activities. Obviously, water supply may incorporate several sub processes that belong to services, such as water transportation or sanitation. Nevertheless, usually, what is sold is the water itself, not those services per se. The final product is processed water, which can be stored and isolated from its provider or user. The whole operation is akin to that of producing standard goods using intermediary inputs and services. Actually, selling water services only, for instance sewerage would require that the customer remain the owner of the water, on which the services would be applied.

An adapted line of reasoning is to be applied to recycling and waste disposal. Recycling (#383 *Materials recovery*), where the operator becomes the owner of the waste, which he may sell after transformation as input for further processes, is not a service activity. Contrary to waste disposal, its main dimension does not rely in getting rid of refuse (i.e. essentially a collect, transport and storage activity). It is important to make a proper distinction between the common language, which may see recycling activities as bringing a service to customers, as every economic activity do, and the essence of those activities which is acquiring waste to transform it into new raw materials. In this perspective, Rev. 3.1 that included *Recycling* in manufacturing industries was accurate, even if its motive almost certainly was not that of this paper.

As stated above, waste collection, disposal or sewerage are mainly services activities. Nevertheless, it is worth mentioning that the activities grouped in the sub heading *Waste treatment and disposal* (#382), may in the near future become goods-producing, when derived power generation and similar productive operations have reached a dominant share of their turnover. When this is achieved the recycling dimension will supersede the disposal dimension.

The ensuing, *Remediation activities and other waste management services* (#39) heading, which gathers decontamination and cleaning of soils and groundwater activities complies with the service definition.

Table 1. Water supply, sewerage, recycling.

Rev. 4 presentation

Sections	Divisions	Description	Category	Comments
E	36–39	Water supply; sewerage, waste management and remediation activities		
	36	Water collection, treatment and supply	<i>goods</i>	<i>See main text</i>
	37	Sewerage	<i>services</i>	collecting and transporting; maintenance and cleaning
	38	Waste collection, treatment and disposal activities; materials recovery		
	381	<i>Waste collection</i>	<i>services</i>	collection, treatment, and disposal
	382	<i>Waste treatment and disposal</i>	<i>services</i>	<i>maybe associated with power generation</i>
	383	<i>Materials recovery</i>	<i>goods</i>	<i>recycling: processing waste into new raw materials</i>
	39	Remediation activities and other waste management services	<i>services</i>	

Rev. 3.1 presentation

D (Manuf.)	37	Recycling	goods	See main text
O (Personal serv.)	90	Sewage and refuse disposal, sanitation and similar activities	Mainly services	collection & treatment of household and industrial waste, not for a further use

F section: Construction

The Construction section is traditionally categorised with goods producing, but several sub-activities are services producing, not considering allocating workers for construction, which belongs to the business services sector.

The *Specialised construction activities* (#43, see table n°3) concerns: “the construction of parts of buildings and civil engineering works, without responsibility for the entire project” (UN 2008 p. 175). Those activities are mostly carried out under subcontract, and may be directly done for the owner of the property, especially in repair construction. For instance they encompass *Demolition and site preparation* or *Building completion* services (including repair services), which are carried out on non self-produced parts. Thus overall they are services producing activities.

Construction installation activities grouped in *Electrical, plumbing and other construction installation activities* (#432), consistently with *Installation of industrial machinery* (# 332), are providing services, because most often the installed part is not self-produced by the company, or when adapted, not fundamentally transformed and the value of the installed parts is rather low as compared to the service dimension of the whole activity. Besides, as exposed before, those activities are carried out as specific activities.

G section: Trade

No doubt that almost all activities gathered in the trade section provide services. However considering the deindustrialisation debate, it is worth mentioning that trade includes what Bernard & Fort (2013) name factoryless goods producer (FGP), i.e. plants and firms that are primarily involved in activities related to the overseas production of manufactured goods, but are incorporated by statistics within wholesale. Those economic units organise manufacturing abroad, for instance they design and market their own goods. They are at the head of an international manufacturing process, and thus they could be grouped in the manufacturing section. In USA according to Bernard & Fort (2013) FGP establishments, amounted to a 6.5 percent of total wholesale in 2002 (10.5 in 2007) and account for 10.2 percent of employment and 5.2 percent of output. If shifted to the manufacturing sector it would displace to manufacturing at least 431,000 workers to as many as 1,934,000 workers from wholesale in 2007.

Those views apply on “wholesale establishment that performs design/ engineering/R&D activity at the establishment and either conducts manufacturing operations at the establishment itself or purchases manufacturing services from a domestic or foreign company” (Bernard & Fort 2013 p. 12). It is worth noticing that the new definition of services also tends to shift those economic units to goods-producing, for two reasons. On the one hand they are involved in the production of information goods (design; engineering and R&D). On the second hand, as principals, i.e. buyers of foreign manufacturing services, they are the owners of the transformed goods, which production they have initiated. Therefore the new service definition supports the interpretation of Bernard & Fort. Yet, it will not be implemented in this paper because the special information required was not available.

J Section: Information and Communication

The section has been created with ISIC Rev. 4, its forewords stresses that it includes: “the production and distribution of information and cultural products” (UNO 2008 p. 205). Quite many of those cultural products, over which ownership rights maybe established are actually information goods, or in SNA’s terms Knowledge-capturing products, only their delivery is a service activity. It is hence the chief section which interpretation is impacted by the new service definition.

The case of *Printing and reproduction of recorded media* (#18) and *Publishing* (#58) is especially interesting. Although the former activity is traditionally viewed as belonging to the manufacturing industries, with a few exceptions⁶⁶, and the latter to services, the new perspective tends to revisit this disconnection. Truly indeed Printing result in an isolable entity thus belongs to goods-producing, but Publishing may also be so attributed. As the manual states: “Publishing includes the acquisition of copyrights to content (information products) and making this content available to the general public by engaging in (or arranging for) the reproduction and distribution of this content in various forms” (UN 2008 p. 206). While the distributive part of the activity definitely belongs to services, but is most frequently carried out independently by various stores and retailers (included in Trade section), the other components of the activity are concerned by production and reproduction. In these last circumstances, the product (asset if an original) under exchange is prone to ownership rights, and thus the activity falls within the goods-producing sector. Let us emphasise that this rationale is applicable to all sub-sectors which deal with information goods production, such as software, directory or mailing lists, newspapers, motion pictures (see Table n°2).

For the two divisions: Motion picture, video and television programme production, sound recording and music publishing activities and Programming and broadcasting activities (#59 & # 60), the main principles drive to separate programming or production (i.e. the activity of making a motion picture, a video or a TV programs, or else making a matrix through recording⁶⁷) and the broadcasting or distribution. The former falls within the goods-producing category, since it results in an information good, whereas the latter within services. However, those two activities are not always distinguished. Although mixed, the sub-headings may generally be counted with goods-producing because the main

⁶⁶ Division #18 Printing and reproduction of recorded media, is included in Manufacturing in ISIC rev. 4, of which #1812 is Service activities related to printing.

⁶⁷ Music and sound recording may either result in a service or in an information good depending on the commercial contract. However since it is mixed with Publishing it is categorised in goods producing.

share of their value added is external to the sole broadcasting activity. However there are three exceptions, sub-headings #5912, #5913 and #5914 (see Table n°2).

Table 2. *Information and Communication* (#58-63).

Division	Group	Class	Description	Category
Division 58			Publishing activities	goods
	581		Publishing of books, periodicals and other publishing activities	
	582		Software publishing	
Division 59			Motion picture, video and television programme production, sound recording and music publishing activities	
	591		Motion picture, video and television programme activities	goods
		5911	Motion picture, video and television programme production activities	goods
		5912	Motion picture, video and television programme post-production activities	services
		5913	Motion picture, video and television programme distribution activities	services
		5914	Motion picture projection activities	services
	592	5920	Sound recording and music publishing activities	Mainly G
Division 60			Programming and broadcasting activities	
	601	6010	Radio broadcasting	Mainly S
	602	6020	Television programming and broadcasting activities	Mainly G
Division 61			Telecommunications	services
Division 62			Computer programming, consultancy and related activities	
		6201	Computer programming activities	goods
		6202	Computer consultancy and computer facilities management activities	services
		6209	Other information technology and computer service activities	services
Division 63			Information service activities	
	631		Data processing, hosting and related activities; web portals	Mainly Serv., because 6311 > 6312
		6311	Data processing, hosting and related activities	Services: not owned or self-produced data
		6312	Web portals	goods
	639		Other information service activities	goods
		6391	News agency activities	see text
		6399	Other information service activities n.e.c.	see text

Computer programming, consultancy and related activities sub-section (#62) includes programming activities that result in information goods, such as software.

Information service activities (#63), includes data processing and web portals activities, of which several headings may be included in goods-producing, when then produce and sell information. Most frequently data processing operates on third parties data (see Rev. 3.1 accompanying comments), whereas web portals activities provide data or information they have mostly produced (gathered). Since the provision of information is also organised through a long term access license, it is useful to remind how SNA deals with such transactions. A copy purchased with a license is regarded as a commodity (or fixed asset) if “the licensee assumes all the risks and rewards of ownership copies (SNA 2009, § 10.100)”. The only situation when a license does not fall within the asset/ commodity case, is when it does not involve a long-term contract. In these circumstances the transaction relates to a flow of services. Consequently, a long-term license of use, which is quite frequent, is almost analogous to full ownership and outright sale.

Other information service activities class (#639) is quite mistakenly labelled. This class includes, activities such as news agencies, which main object is to sell information, which is obviously separable from its provider or receiver, thus an information good.

Section M: *Professional, scientific and technical activities* (#69–75), gathers mainly services producing activities, but the purpose of several maybe producing authorised documents, design charts or reports, over which ownership rights may be established. When it becomes their main output they have to be categorised in information goods producing. It is especially the case of *Advertising and market research activity* (#73), which object is the creation of advertising campaigns and placement of such advertising in periodicals... those output take a separable form, or result in advisory document or reports (marketing and poll research).

Finally, altogether as compared to common practice, which tends to agglomerate broad sections to measure the tertiarisation and deindustrialization trends, this analysis shows that there are at least height headings or sub headings that are related to services in broad sections A-B-C-F, that are usually viewed as purely goods-producing. Conversely there are nearly a dozen headings, or sub headings, that relates to goods in broad sections D-E-J-M that are usually viewed purely connected to services-producing. The result of the preceding survey is summarised in table n°3.

Table 3. ISIC Rev. 4 Main list of industries (excerpts).

Sections	Divisions	Descriptions	Category	Comments
A	01–03	Agriculture, forestry and fishing	Goods	
	016	Support activities to agriculture and post-harvest crop activities	services	
	024	Support services to forestry	services	
B	05–09	Mining and quarrying	Goods	
	09	Mining support service activities	services	
C	10–33	Manufacturing	Goods	
	1313	Finishing of textiles	services	done for third parties Cf. rev. 3.1 comments
	1812	Service activities related to printing	services	
	259	Manufacture of other fabricated metal products; metalworking service activities	Mainly services	except 2593, 2599 ⁶⁸
	33	Repair and installation of machinery and equipment	Services	
	331	Repair of fabricated metal products, machinery and equipment service	Services	Services since specialised activity
	332	Installation of industrial machinery and equipment	Services	when an integral part of a building, belongs to construction
D	35	Electricity, gas, steam and air conditioning supply	Mainly Goods	see main text
		35.12 Transmission of electricity 35.13 Distribution of electricity 35.14 Trade of electricity 35.22 Distribution of gaseous fuels through mains 35.23 Trade of gas through mains	Services	NACE 2
E	36–39	Water supply; sewerage, waste management and remediation activities		see main text
	36	Water collection, treatment and supply	Goods	
	37	Sewerage	Services	
	38	Waste collection, treatment and disposal activities; materials recovery	Mainly serv.	see main text

⁶⁸ Rev. 4: 2593 Manufacture of cutlery, hand tools and general hardware ; 2599 Manufacture of other fabricated metal products n.e.c; Rev. 3.1: 25.50 Forging, pressing, stamping and roll-forming of metal; powder metallurgy ; 25.60 Treatment and coating of metals; machining

Sections	Divisions	Descriptions	Category	Comments
	39	Remediation activities and other waste management services	Services	
F	41–43	Construction		
	41	Construction of buildings	Goods	
	42	Civil engineering	Goods	can be carried out on a fee or contract basis, but on self owned or produced parts
	43	Specialised construction activities	Mainly Services	see main text
	43.1	Demolition and site preparation	Mainly Services	
	43.2	Electrical, plumbing and other construction installation activities	Mainly Services	sub contracted (consist in the adaptation or installation of not self-produced materials for third parties)
	43.3	Building completion and finishing		
	43.9	Other specialised construction activities		
G	45–47	Wholesale and retail trade; repair of motor vehicles and motorcycles	Services	
H	49–53	Transportation and storage	Services	
I	55–56	Accommodation and food service activities	Services	
J	58–63	Information and communication	Goods predominant	see main text
K	64–66	Financial and insurance activities	Services	
L	68	Real estate activities	Services	
M	69–75	Professional, scientific and technical activities	Mainly services	
	73	Advertising and market research	goods	Information goods
	741	Specialised design activities	goods	creating and developing designs : originals
N	77–82	Administrative and support service activities	Services	
O	84	Public administration and defence; compulsory social security	Services	
P	85	Education	Services	
Q	86–88	Human health and social work activities	Services	
R	90–93	Arts, entertainment and recreation	Services	
S	94–96	Other service activities	Services	
T	97–98	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	Mainly services	
	981	Undifferentiated goods-producing activities of private households for own use	Goods	
	982	Undifferentiated service-producing activities of private households for own use	Services	
U	99	Activities of extraterritorial organizations and bodies	Services	

For the need of the study the categorisation analysis has also been conducted on ISIC Rev. 3. 1, accordingly with the principles that were explained before, the result is shown in table n°4.

Table 4. ISIC Rev. 3.1 / NACE 1.1 Main list of industries (excerpts).

Section	Divisions	Description	Category	comments
A	01, 02	Agriculture, hunting and forestry	goods	
	14	Agricultural and animal husbandry service activities, except veterinary activities	services	
	0200	Forestry, logging and related service activities	Mainly goods	Goods so dominant that mention of services vanishes in Rev. 4
B	05	Fishing	Mainly goods	
C	10-14	Mining and quarrying	Mainly goods	
	112	Service activities incidental to oil and gas extraction excluding surveying	services	
D	15-37	Manufacturing	Mainly goods	
	1511	Production, processing and preserving of meat and meat products	Mainly goods	slaughter houses may produce for third parties
	1712	Finishing of textiles	Services	not self-produced textile fibres
	2222	Service activities related to printing	Services	
	289	Manufacture of other fabricated metal products; metal working	Mainly services	except 2893 ; 2899, see note 8.
	32.1D	Assemblage de cartes électroniques pour compte de tiers	Services	French classification idiosyncrasy
	351	Building and repairing of ships and boats	Services	Repairing included in repair Rev. 4
	37	Recycling	goods	
E	40, 41	Electricity, gas and water supply	Mainly goods	see Utilities
		40.13 Distribution and trade of electricity 40.22 Distribution and trade of gaseous fuels through mains	services	NACE 1.1
		41.0 Collection, purification and distribution of water	services	NACE 1.1
F	45	Construction		see main text
	451	Site preparation	services	
	453	Building installation	mainly services	
	454	Building completion	mainly Services	
	455	Renting of construction or demolition equipment with operator	services	
G	50-52	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	services	
H	55	Hotels and restaurants	services	
I	60-64	Transport, storage and communications	services	
J	65-67	Financial intermediation	services	
K	70-74	Real estate, renting and business activities	services	
	72	Computer and related activities	mainly services	
	722	Software publishing, consultancy and supply	goods	mainly production of software
	724	Database activities and on-line distribution of electronic content	Mainly goods	on-line publishing of self-produced data

Section	Divisions	Description	Category	comments
				dominant
	725	Maintenance and repair of office, accounting and computing machinery	services	
	7413	Market research and public opinion polling	Mainly goods	Activity separable from recipient
	742	Architectural and engineering activities and related technical consultancy	Mixed, mainly services	goods becoming dominant outside of architecture consultancy (class split in Rev. 4)
	743	Advertising	goods	creation and realisation of advertising campaigns
L	75	Public administration and defence; compulsory social security	services	
M	80	Education	services	
N	85	Health and social work	services	
O	90-93	Other community, social and personal service activities	services	
	90	Sewage and refuse disposal, sanitation and similar activities	mainly services	collection and treatment of household and industrial waste, not for a further use
	921	Motion picture, radio, television and other entertainment activities	mixed	
		9211 Motion picture and video production and distribution	mainly goods	
		9213 Radio and television activities	Idem	only broadcasting is a service
	922	News agency activities	goods	
		<i>Artistic and literary creation (92.31)</i>	<i>goods</i>	<i>NACE I</i>
P	95	Activities of private households as employers and undifferentiated production activities of private households	services	
	96	Undifferentiated goods-producing activities of private households for own use	goods	
	97	Undifferentiated service-producing activities of private households for own use	services	
Q	99	Extra-territorial organizations and bodies	services	

The next step of the study consist in measuring how much the new reading affects the share of goods producing and services producing.

3 What changes for goods and services producing shares?

To be implemented, the reorganisation requires at least detailed data at the four digit level, but they are not available on the OECD STAN database dedicated to industrial data and ordered accordingly to ISIC principles. However, Eurostat provides annual detailed enterprise statistics for various industries arranged following NACE classification, which is inspired by and very close to ISIC, but which does not cover the entire economy (see below).

The analysis of the evolution of industrial shares requires a rather long period of comparison. Unfortunately the new ISIC Rev. 4 classification has introduced in 2008 a major divide in statistics series. This gap cannot be bridged, because the changes between Rev. 3.1 and Rev. 4 are too numerous and too deep, for instance a great number of manufacturing headings have been split into three, even four new divisions, also the number of headings have been significantly extended. Another difficulty comes from the creation of new broad sections like Information and Communication (J).

The same phenomenon occurred for NACE. Thus series of data following ISIC Rev. 3.1 (resp. NACE 1.1), may range up to 2007; new series following ISIC Rev. 4 principles (resp. NACE 2) begin in 2008. As a consequence recent tables are based on NACE 2 and the old ones on NACE 1 or NACE 1.1⁶⁹.

Two series of tables are proposed. The first series is based on NACE 2 (ISIC Rev. 4) and concerns the share of employment and value Added (at factor costs) in goods and services producing sectors for the UE 27 as a whole and for France. They range from 2008 to 2011. The second series of tables concerns France only and use a particular national source (see appendix for the characteristics of the source). It is based on a special extraction of enterprise data at the finest unrestricted level (five digits) of NACE 1 (1995 to 2002) & 1.1 (2003 to 2007). This level is not available in Eurostat database, yet it is especially valuable to classify as much as possible the results in headings approximately close to those of Rev. 4.

It must be reminded that in the two series of tables the depicted economy is not entire; several major broad sections are not included in both the databases, such as Agriculture-fishery, Finance-Insurance and Government. In addition, because Structural business statistics (SBS) from Eurostat covers only business economy, in this database Education, Health and social works activities are missing. These deficiencies significantly lessen the tertiarisation trend and the proposed figures may not be comparable with other similar studies. However that phenomenon does not impede this analysis, since its main goal is to scrutinise what are the consequences of the new service definition on the share of employment and VA as compared to the standard views.

3.1 The tertiarisation preserved

Let us warn the reader that due to a shortage of time, the subsequent sub-sections are only sketchy.

The new presentation does not change our broad views on the hierarchy among major sectors, it even magnifies it, nor does it impede the long standing evolution towards services.

Table 5. UE 27 employees (NACE 2 / ISIC 4).

%	Standard presentation					New arrangement			
	2008	2009	2010	2011		2008	2009	2010	2011
Goods producing	38,91	37,32	36,51	36,13		33,88	31,47	30,84	30,97
Mining and quarrying	0,57	0,55	0,53	0,51	Manuf. serv. excluded	0,52	0,51	0,48	0,51
Manufacturing (except publishing)	26,46	25,10	24,81	24,66	Manuf. serv. excluded	25,13	22,96	22,69	22,78
Publishing	0,79	0,79	0,72	0,77	Info. goods sectors	2,75	2,82	2,74	2,85
Recycling	0,13	0,13	0,14	0,15	Recycling & Water supply	0,44	0,44	0,47	0,48
Electricity, gas, steam and air conditioning supply (D)	1,03	1,03	1,05	1,02	Distribution & serv. related excluded	0,50	0,50	0,53	0,66
Construction (F)	9,93	9,73	9,26	9,01	Serv. related excluded	4,53	4,25	3,93	3,70
Services producing	61,09	62,68	63,49	63,87		66,11	68,53	69,16	69,04
Manufacturing & mining services						1,38	2,13	2,12	1,86
Services related to D & F						5,94	6,01	5,85	5,68
Wholesale and retail trade; repair of motor vehicles	23,32	23,99	23,92	23,93		23,32	23,99	23,92	23,93
Transportation and storage	8,43	8,22	8,26	8,25		8,43	8,22	8,26	8,25
Accommodation and food service activities	6,84	7,19	7,32	7,33		6,84	7,19	7,32	7,33
Real estate activities	1,43	1,49	1,47	1,48		1,43	1,49	1,47	1,48

⁶⁹ As a matter of fact there has been a slight change in the European classification in 2003 (NACE 1.1), which included few aspects that were eventually confirmed with NACE 2/ ISIC Rev. 4. This update has only little consequences for this study. It essentially affects wholesale and, marginally, 722 A-Z Software publishing.

%	Standard presentation					New arrangement			
	2008	2009	2010	2011		2008	2009	2010	2011
Professional, scientific and technical activities	6,83	7,02	7,04	7,10	Info. goods excluded	6,01	6,15	6,21	6,21
Administrative and support service activities	9,43	9,88	10,47	10,77		9,43	9,88	10,47	10,77
Repair of computers and personal and household goods	0,20	0,21	0,20	0,19		0,20	0,21	0,20	0,19
Water supply; sewerage, waste management and remediation activities	0,93	0,95	0,99	1,02	water supply excluded	0,61	0,64	0,67	0,69
Information and communication	3,69	3,74	3,81	3,81	Info. goods excluded	2,54	2,58	2,62	2,64
Total	100,0	100,0	100,0	100,0		99,99	100,0	100,0	100,0

Source: Eurostat Structural Business Statistics (SBS)

Table 6. UE 27 value added (NACE 2 / ISIC 4).

%	Standard presentation					New arrangement			
	2008	2009	2010	2011		2008	2009	2010	2011
Goods producing	42,73	40,56	41,21	40,94		36,39	33,70	35,35	36,39
Mining and quarrying	1,62	1,28	1,41	1,46	Manuf. serv. excluded	1,51	1,19	1,31	1,46
Manufacturing (except publishing)	27,09	25,06	26,69	26,73	Manuf. serv. excluded	25,02	23,18	24,76	24,99
Publishing	0,97	1,11	1,04	1,00	Information goods sectors	3,65	3,07	3,72	3,87
Recycling	-	0,13	0,15	0,17	Recycling & Water supply	0,47	0,63	0,65	0,67
Electricity, gas, steam and air conditioning supply (D)	3,24	3,80	3,58	3,47	Distribution & serv. related excluded	1,72	1,95	1,68	2,34
Construction (F)	9,80	9,18	8,33	8,09	Serv. related excluded	4,03	3,70	3,23	3,05
Services producing	57,27	59,44	58,79	59,06		63,64	66,34	64,63	63,58
Manufacturing & mining services						2,17	1,79	1,97	1,75
Services related to D & F						7,30	7,32	7,00	6,17
Wholesale and retail trade; repair of motor vehicles	18,71	19,86	19,33	19,34		18,71	19,86	19,33	19,34
Transportation and storage	7,73	7,80	7,92	7,79		7,73	7,80	7,92	7,79
Accommodation and food service activities	3,15	3,36	3,28	3,37		3,15	3,36	3,28	3,37
Real estate activities	3,57	3,94	3,86	3,89		3,57	3,94	3,86	3,89
Professional, scientific and technical activities	9,30	9,33	9,41	9,41	Info. Goods excluded	8,30	9,21	8,50	8,45
Administrative and support service activities	6,33	6,27	6,38	6,57		6,33	6,27	6,38	6,57
Repair of computers and personal and household goods	0,17	0,17	0,16	0,16		0,17	0,17	0,16	0,16

%	Standard presentation					New arrangement			
	2008	2009	2010	2011		2008	2009	2010	2011
Water supply; sewerage, waste management and remediation activities	1,14	1,26	1,30	1,32	water supply excluded	0,67	0,77	0,80	0,81
Information and communication	7,18	7,45	7,15	7,22	Info. Goods excluded	5,54	5,67	5,36	5,27
Total	100,0	100,0	100,0	100,		100,0	100,0	100,0	100,0

Source: Eurostat Structural Business Statistics (SBS)

Whether measured, by employment or Value Added, the share of services sectors raises with the new arrangement (Tables n°5 to 8), by 4 to almost 10 points of percentage, depending of the reference and the country under scrutiny.

This result most of all derives from two conflicting changes; the first one concerns the better delineation of Manufacturing and Construction services, which in turn increases the share of services producing, by approximately at least 7% for UE 27. It is worth underlining that the influence of Construction services is well above that of Manufacturing services. As a matter of fact Construction services at least amount to a 50% of the Construction section. The second one is the creation of Information goods, which indeed tends to increase the share of Goods-producing activities, but by a mere 2 or 3 percentage points. This study thus shows that the weight of Manufacturing services, by far supersedes that of Information goods. Nevertheless that first learning does not exhaust the subject.

Indeed the comparison between employment and value added tables gives rise to another interesting finding. The share of the goods producing sectors measured in VA is larger than when done in employment (respectively that of services producing is smaller), both with the standard and the new arrangement. However this imbalance tends to increase when the shares are measured through the new method. It is especially noticeable for France, which level of goods-producing is lower than EU 27. Similarly, the fall of goods-producing nearly vanishes when using the new definition when measured in VA for EU 27. These facts illustrates that the VA per employee produced by the newly measured manufacturing services --hence subtracted to goods producing, is smaller than that of the information goods sectors --which are added. In other terms, Information goods sectors are more productive than Manufacturing services. This finding is to be combined with that of the next sub-section.

Table 7. Number of employees (%) France (NACE 2 / ISIC 4).

	Standard presentation					New arrangement			
	2008*	2009	2010	2011		2008*	2009	2010	2011
Goods producing	38,73	36,19	34,98	34,19		29,88	26,52	25,51	25,04
Mining and quarrying	0,20	0,19	0,18	0,18	serv. excluded	0,20	0,19	0,18	0,18
Manufacturing (except publishing)	25,21	22,38	21,34	20,89	serv. excluded	22,44	19,67	18,76	18,37
Publishing	1,03	1,03	0,97	0,95	Info. goods sectors	2,62	2,75	2,76	2,68
Recycling	0,20	0,20	0,22	0,21	Recycling & Water supply	0,52	0,46	0,51	0,50
Electricity, gas, steam supply (water excl.) (D)	1,40	1,20	1,20	1,20	Distribution & serv. related excluded	1,32	1,17	1,18	1,18
Construction (F)	10,69	11,18	11,06	10,76	Serv. related excluded	2,57	2,27	2,11	2,13
Services producing	61,27	63,81	65,02	65,81		69,61	73,48	74,49	74,96
Manuf. & mining services						2,78	3,02	2,99	2,94
Serv. related to D & F						8,20	8,94	8,97	8,66
Wholesale and retail; repair of motor vehicles	22,91	22,20	21,88	21,79		22,91	22,20	21,88	21,79
Transportation and storage	10,62	9,53	9,45	9,20		10,62	9,53	9,45	9,20
Accommodation and food service activities	5,95	6,13	6,30	6,23		5,95	6,13	6,30	6,23

	Standard presentation					New arrangement			
	2008*	2009	2010	2011		2008*	2009	2010	2011
Real estate activities	1,60	1,68	1,75	1,77	Info. goods excluded	1,60	1,68	1,75	1,77
Professional, scientific and technical activities	7,39	7,51	7,82	7,97		6,30	6,49	6,71	6,95
Administrative and support service activities	6,96	11,47	12,45	13,43		6,96	11,47	12,45	13,43
Repair of computers and personal and household goods	0,36	0,34	0,32	0,31		0,36	0,34	0,32	0,31
Water supply; sewerage, waste management and remediation activities	0,92	0,83	0,85	0,86	water supply excluded	0,61	0,57	0,55	0,56
Information and communication	4,56	4,12	4,20	4,24	Info. goods excluded	3,33	3,42	3,52	3,53
Total	100,0	100,0	100,0	100,0		100,0	100,0	100,0	100,0

* Due to an erratic value for Administrative and support service activities (Section N) in the database, figures for 2008 are dubious. As a consequence Goods producing is exaggerated (respect. Services producing is lessened) by approximately 2 point of %.

Source: Eurostat Structural Business Statistics (SBS)

Table 8. Value added fat actor costs % France (NACE 2 / ISIC 4).

	Standard presentation					New arrangement			
	2008	2009	2010	2011		2008	2009	2010	2011
Goods producing	38,04	36,83	36,54	36,00		30,20	29,13	28,79	28,69
Mining and quarrying	0,32	0,29	0,25	0,29	Manuf. serv. excluded	0,31	0,29	0,25	0,29
Manufacturing (except publishing)	23,44	22,16	22,18	21,77	Manuf. serv. excluded	21,21	19,82	19,89	19,45
Publishing	1,17	1,26	1,25	1,21	Info. goods sectors	3,20	3,73	3,65	3,66
Recycling	0,22	0,16	0,24	0,22	Recycling & Water supply	0,56	0,47	0,63	0,62
Electricity, gas, steam supply (water excl.) (D)	2,61	2,79	2,84	2,75	Distribution & serv. related excluded	2,48	2,73	2,50	2,72
Construction (F)	10,28	10,17	9,78	9,77	Serv. related excluded	2,16	2,09	1,87	1,94
Services producing	61,96	63,17	63,46	64,00		69,17	70,87	71,21	71,31
Manufacturing & mining services						2,24	2,19	2,31	2,39
Services related to D & F						8,25	8,15	8,26	7,87
Wholesale and retail trade; repair of motor vehicles	19,26	19,61	19,29	19,49		19,26	19,61	19,29	19,49
Transportation and storage	8,70	8,97	8,82	8,65		8,70	8,97	8,82	8,65
Accommodation and food service activities	3,58	3,85	3,94	4,05		3,58	3,85	3,94	4,05
Real estate activities	3,69	4,10	4,17	4,34		3,69	4,10	4,17	4,34
Professional, scientific and technical activities	10,23	10,12	10,70	10,73	Info. goods excluded	9,26	9,06	9,66	9,67

	Standard presentation					New arrangement			
	2008	2009	2010	2011		2008	2009	2010	2011
Administrative and support service activities	8,03	7,66	7,79	7,96		8,03	7,66	7,79	7,96
Repair of computers and persoal and household goods	0,31	0,31	0,31	0,31		0,31	0,31	0,31	0,31
Water supply; sewerage, waste management and remediation activities	0,89	0,87	0,98	0,99	water supply excluded	0,55	0,56	0,58	0,58
Information and communication	7,27	7,69	7,46	7,48	Info. goods excluded	5,31	6,28	6,09	6,09
Total	100,0	100,0	100,0	100,0		99,37	100,0	100,0	100,0

Source: Eurostat Structural Business Statistics (SBS)

3.2 Tertiariation in the two last decades in France at a glance

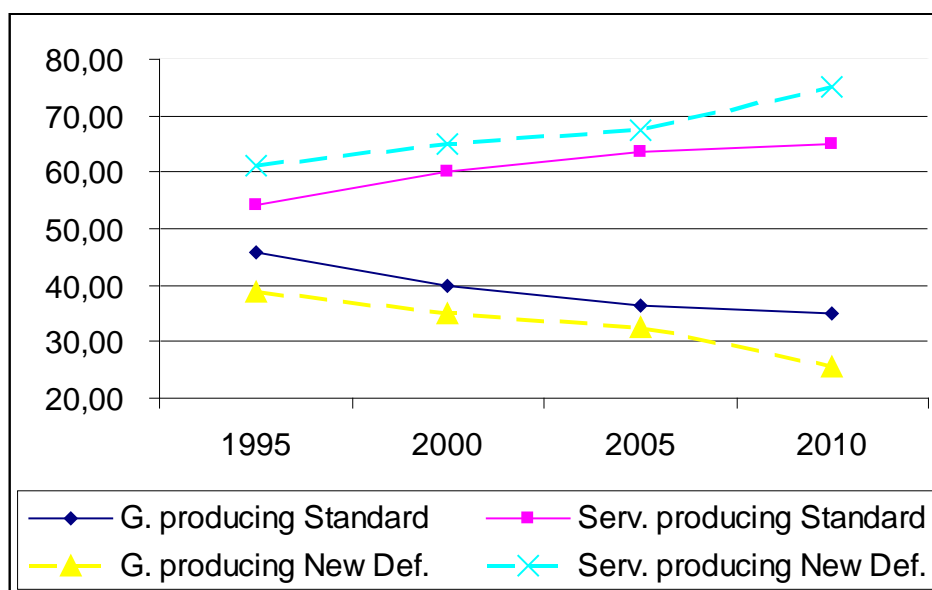
Let us now turn to findings concerning especially the French economy, for which it has been possible to gather data ranging from 1995 to 2011 (Tables n°10 to 7). However, due to the change in the classification, they are split in two series of tables. The two series use consistent sources and data, but are built on two versions of the NACE / ISIC classification. In order to facilitate the reading, the table following NACE 1 has been rendered, as much as possible, close to the NACE 2 ordering. For instance Recycling and Water supply have been removed from Manufacturing and similarly several services-producing headings are depicted out of their formally intended broad sections. Nevertheless, as previously noticed the changes introduced in 2008 are so deep and numerous, than an adequate matching for all headings is out of reach. Nevertheless, broad figures and several divisions are consistent and the evolution of the share of goods and services producing sectors may be read on the whole period.

As explained above the new definition confirms and even increases the tertiarisation phenomenon (Graph n°1a & b) ⁷⁰. Moreover the study corroborates the usual profile of the deindustrialisation tendency (Kutscher Personick 1986), as stressed for instance by Montresor Vittucci Marzetti (2011): « For a long time, the global process of tertiarisation was accompanied by rising industrial shares in total value added, but from 1970, tertiarisation coincided with relative downsizing of the manufacturing sector » (Memedovic Lapadre 2009 p. 49).

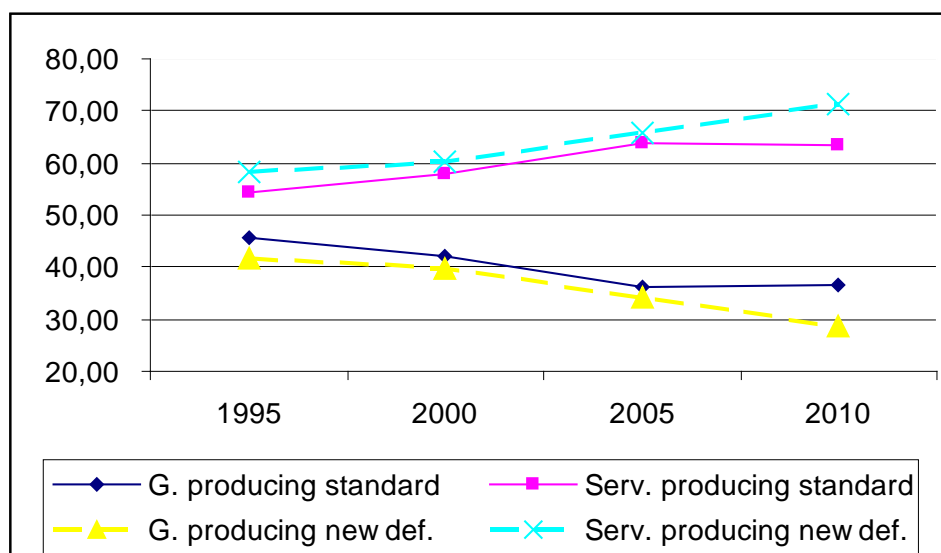
Nevertheless, the new definition tends to lessen the tertiarisation trend by approximately 2 points of % (Tables n°9 & 10). This remark may seem at odds with the year 2010, for which data arranged consistently with the new definition, depict a stronger increase in tertiarisation, than those according to the standard method. This occurrence, even more obvious for the value added figures, actually illustrates that the data ordered according NACE 2 principles, better measure Manufacturing services, which reach almost a 3% in 2010, as compared to a mere 1.1% in 2005, when assessed accordingly with NACE 1.1.

That circumstance somehow hides the fact that, in the last decades, the discrepancy between the standard and new modes of presentation tends to shrink (Tables n°9 & 10). Two reasons may be proposed to explain this phenomenon: due to the reducing pace of the reorganisation of production process, Manufacturing services expands more slowly than before. In addition, the long established weakening of the goods producing sectors also affects the magnitude of manufacturing services. In other words, outsourced activities (agent activities) are affected by the size of their principals. From 1995 to 2007, in France the weight of Manufacture services in employment, has decreased from a 1.2% to a 1%. Conversely, Information goods sectors are in an exact opposite situation: they experience a growth trend. It is thus possible to envision that, in the future, those two tendencies will cross each other, with as an impending consequence a potential rise in goods-producing.

⁷⁰ The data presented don't reallocate temporary workers in the users sectors, as for instance Bernard, Smeets and Warzynski (2014) or Shreiber and Vicard (2011) do. If done so, it would have approximately add a 10% employee in Manufacturing, and reduce Real estate, renting and business activities employment by an 18%, thus slightly lessening the deindustrialisation. Let us however notice that, while this correction is relevant for the measurement of employment shares, it is not for Value Added.



Graph 1a. Evolution of employment shares in % in France.



Source: special exploitation of SUSE INSEE database (see appendix) & Eurostat SBS database for 2010 (see above).

Figure 1b. Evolution of Value Added shares in % in France.

Table 9. Emploi France % (NACE 1 / ISIC 3.1).

	Standard presentation					New arrangement			
	1995	2000	2005	2007		1995	2000	2005	2007
Goods producing	45,70	39,78	36,37	35,21		38,97	34,98	32,53	30,03
Mining and quarrying	0,50	0,31	0,21	0,20	Manuf. serv. excluded	0,50	0,31	0,21	0,20
Manufacturing (exc. recycl. & publishing)	32,08	28,05	24,66	22,84	Manuf. serv. excluded	30,85	26,91	23,57	21,83
Publishing (book & newspaper)	1,89	1,59	1,33	1,22	Information goods sectors (incl. publishing)	4,49	5,01	5,86	4,97
Recycling	0,18	0,18	0,20	0,21	Recycling & water supply	0,50	0,43	0,45	0,45

	Standard presentation					New arrangement			
	1995	2000	2005	2007		1995	2000	2005	2007
Electricity, gas, steam & air conditioning supply (D)	0,21	0,14	0,19	0,17		0,21	0,14	0,16	0,14
Construction (F)	10,83	9,50	9,77	10,57	Serv. related excluded	2,43	2,18	2,28	2,43
Services producing	54,30	60,22	63,63	64,79		61,03	65,02	67,47	69,97
Manufacturing & mining services						1,23	1,14	1,10	1,01
Service related to D & F						8,40	7,32	7,53	8,17
Wholesale and retail trade; repair of motor vehicles and motorcycles	21,34	21,39	21,61	21,51		21,34	21,39	21,61	21,51
Transportation and storage	5,88	6,24	5,97	5,90		5,88	6,24	5,97	5,90
Accommodation and food service activities	4,25	5,05	5,73	5,86		4,25	5,05	5,73	5,86
Real estate activities	2,44	2,33	2,49	2,57		2,44	2,33	2,49	2,57
Professional, scientific and technical activities n. e. c	9,97	12,09	13,11	13,63		9,97	12,09	13,11	13,63
Advertising & market research	2,35	3,21	3,40	3,62	Info. Goods excluded	0,68	1,29	1,38	1,46
Computer and related activities (except repair)	1,38	2,15	2,39	2,59	Info. Goods excluded	0,88	1,17	0,51	1,63
Communication	0,12	0,39	1,12	0,99		0,12	0,39	1,12	0,99
Motion picture, radio, TV & news agencies	0,51	0,56	0,59	0,59	Info. Goods excluded	0,15	0,16	0,16	0,17
Personal, recreational and support service activities n. e. c	1,95	2,15	2,17	2,29	Info. Goods excluded	1,89	2,04	1,97	2,08
Water supply; sewerage, waste management and remediation activities	0,67	0,65	0,75	0,75	Water supply excluded	0,36	0,40	0,49	0,50
Education, Health & Social Work	3,31	3,88	4,19	4,38		3,31	3,88	4,19	4,38
Repair of computer & personal and household goods	0,12	0,12	0,12	0,11		0,12	0,12	0,12	0,11
Total	100,0	100,0	100,0	100,0		100,0	100,0	100,0	100,0

Source: special exploitation of SUSE INSEE database, see appendix.

Table 10. France % VA (NACE I / ISIC 3.1).

	Standard presentation					New arrangement			
	1995	2000	2005	2007		1995	2000	2005	2007
Goods producing	45,54	42,03	36,31	35,60		41,88	39,68	34,07	33,07
Mining and quarrying	0,61	0,39	0,53	0,50	Manuf. serv. excluded	0,61	0,39	0,52	0,49
Manufacturing (exc. recycl., & publishing)	33,87	31,70	25,84	24,23	Manuf. serv. excluded	32,80	30,72	24,97	23,42
Publishing (book & newspaper)	2,16	1,88	1,50	1,30	Information goods sectors	5,49	6,22	5,95	5,82

	Standard presentation					New arrangement			
	1995	2000	2005	2007		1995	2000	2005	2007
Recycling	0,19	0,18	0,21	0,23	(incl. publish.) & Water supply	0,64	0,44	0,51	0,54
Electricity, gas, steam and air conditioning supply (D)	0,44	0,14	0,23	0,77		0,44	0,14	0,17	0,71
Construction (F)	8,27	7,75	8,01	8,57	Serv. related excluded	1,90	1,78	1,95	2,09
Services producing	54,46	57,97	63,69	64,40		58,12	60,32	65,93	66,93
Manufacturing & mining services						1,07	0,98	0,87	0,82
Service related to D & F						6,38	5,97	6,12	6,55
Wholesale and retail trade; repair of motor vehicles and motorcycles	19,18	19,21	18,60	18,50		19,18	19,21	18,60	18,50
Transportation and storage	5,78	5,41	5,40	5,19		5,78	5,41	5,40	5,19
Accommodation and food service activities	2,91	3,42	3,50	3,58		2,91	3,42	3,50	3,58
Real estate activities	4,92	5,03	5,85	5,96		4,92	5,03	5,85	5,96
Professional, scientific and technical activities n.e.c	8,53	9,47	10,42	11,27		8,53	9,47	10,42	11,27
Advertising & market research	2,77	3,89	4,21	4,34	Info. Goods excluded	0,86	1,53	1,95	2,04
Computer and related activities (except repair)	1,68	2,56	3,11	3,21	Info. Goods excluded	1,06	1,38	1,89	1,96
communication	0,16	0,77	3,43	3,04		0,16	0,77	3,43	3,04
Motion picture, radio, TV and news agencies	1,40	1,26	1,27	1,38	Info. Goods excluded	0,67	0,60	0,52	0,63
Personal, recreational and support service activities n. e. c	1,51	1,58	1,55	1,61	Info. Goods excluded	1,43	1,43	1,33	1,38
Water supply; sewerage, waste management and remediation activities	0,79	0,63	0,74	0,77	Water supply excluded	0,34	0,37	0,44	0,47
Education, Health & Social Work	4,71	4,65	5,49	5,46		4,71	4,65	5,49	5,46
Repair of computer & personal and household goods	0,13	0,10	0,11	0,09		0,13	0,10	0,11	0,09
Total	100,0	100,0	100,0	100,0		100,0	100,0	100,0	100,0

Source: special exploitation of SUSE INSEE database, see appendix

4 Conclusion

The paper suggests a way to reorganise industrial classifications, such as ISIC Rev. 3.1 and 4, to take into account the new definition of services proposed by Hill (1999) and implemented by both SNA and BOP last updates. The changes essentially regard three headings: Manufacturing services, Construction services and Information goods. The former designates manufacturing like services that are operated for third parties on materials that are not self produced or not self owned. A similar rationale applies to Construction services that mostly cover site preparation, installation and specialised construction. Information goods relates to the output of activities, on which ownership rights may be established and which may be sold like goods, for instance software or data. The two former headings add to services-producing, whereas the latter, formerly regarded as services activities, adds to goods-producing.

The reorganisation of the classification lists is tested on Eurostat and INSEE data. Altogether the tertiarisation, as understood as a bigger services-producing sector, is preserved. This proves that the shift of Manufacturing and Construction services has a bigger effect, than that of Information goods. As a matter of fact it is essentially due to Construction services that amount to at least a 50% of the of ISIC Construction division. However the tertiarisation/deindustrialisation trend is affected, since the share of services-producing is growing slower when measured with the

new definition. Implementing the new definition would hence facilitate increasing the share of industry value added as the EC requested. Nevertheless, the last result, which is mostly based on the French case, has to be checked on other countries.

On the whole, it must be underlined that the findings of this first work need to be confirmed and sharpened for several reasons. Firstly they mix up better measurement of services as of ISIC updates and Hill's new definition. Secondly, since the long run trends derive from data mostly ordered under the old classification (Rev. 3.1), it is necessary to make sure that they hold under the recent update. Thirdly the results also need to be tested against more countries to become more relevant. It will be the task of a future work.

Finally the study arouses a comment regarding exports. The current account of the BOP mainly gathers cross-border trade, or in GATS terms mode 1 exports. Many studies have shown that services activities are poor cross-border traders; the new definition strengthens those views, because it reallocates to goods account, information related exports on which ownership rights may be established. This concerns a large share of property rights flows that are grouped in the Charges for the use of intellectual property heading (services account). Moreover exchanges of motion pictures, TV shows and software that were viewed as flows of services become classified within goods. Altogether hence the exports of services shrink, while that of goods increase.

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Appendix

French special data

Source : Ficus 1995–2007

Le fichier Ficus est une extraction de la source statistique SUSE : Système Unifié de Statistique d'Entreprises. Ensemble cohérent de données individuelles et statistiques sur les entreprises, la source statistique SUSE provient de l'exploitation conjointe de deux sources : l'une fiscale, qui regroupe les bénéfices industriels et commerciaux (BIC) et les bénéfices non commerciaux (BNC) et l'autre statistique, l'enquête annuelle d'entreprises (EAE).

Zone : France

Secteur d'activités :

Les activités suivantes :

- L'agriculture, sylviculture, pêche
- Les Activités financières et d'assurance
- l'administration
- les activités associatives et extra-territoriales ne figurent pas dans les tableaux car :
- le fichier Ficus couvre partiellement ces secteurs.
- le plan comptable des activités financières est particulier.

De même, les données sur les entreprises ayant un code activité « défense » sont interdites de diffusion.

Sélections effectuées sur le fichier :

Les observations ayant des numéros siren non renseignés ont été éliminées.

Les observations en double ont été éliminées. On retient les observations dont le montant de la valeur ajoutée est le plus élevé.

Les croisements :

Activités Niveau 700 X (Nombre d'entreprises, Effectif salarié moyen, Valeur ajoutée brute aux coûts des facteurs)

Les tableaux :

13 tableaux, un par année de 1995 à 2007

fichiers en format sas, du type taaa.sas7bdat (*aaaa*) représentant l'année

Le secret statistique en quelques chiffres :

Un certain nombre de cases peuvent être à blanc en raison du secret statistique et fiscal.

Les règles du secret statistique, avalisées par la CNIL dans un avis du 27 mai 1997, concernent le nombre d'unités agrégées d'une part, le poids de chaque unité dans le montant agrégé d'autre part.

Les seuils à appliquer sont les suivants :

- Règles du nombre d'unités
 - Cas général : une donnée agrégée ne sera pas communiquée lorsqu'elle concerne moins de trois unités
 - Cas particulier : En matière de fiscalité des personnes physiques ce seuil est porté à 11 unités

Règle du poids des unités

Une donnée agrégée ne sera pas communiquée lorsqu'elle comprend un élément dominant qui représente plus de 85% du montant agrégé.

Précaution d'emploi :

Les mouvements sur les durées et dates d'exercice, les changements d'activité, les modifications de structure (fusion ou scission d'entreprises) ne rendent pas les évolutions annuelles cohérentes

Service Innovation Research: Looking for Definition and Boundaries

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The paper outlines the intellectual structure of Service Innovation research to provide a comprehensive review of the literature. Authors adopted a rigorous statistical approach and three different multivariate statistical techniques (e.g. non-metric multidimensional scaling, cluster analysis and factor analysis) to identify contributions playing a pivotal role in this domain, and the relationships between different research fronts. Results show three research perspectives, and five common themes, which have been largely debated by scholars. Finally, the study traces emerging trends and gaps to provide a basis for continuous expansion of the service innovation research field.

1 Introduction

In the late 1990s, service innovation started to get attention in all western countries in correspondence with the extension of the process of servitization (Vandermerwe; Rada, 1988) and the overcoming of the conceptual distinction between goods and services (Gummesson, 2005). In a context increasingly becoming service-centric both the service industry and the traditional manufacturing firms become dependent on services (Edvardsson et al., 2013): “the service is the foundational concept of the exchange and consists of the application of specialized competencies (knowledge and skills), through deeds, processes, and performance for the benefit of another entity or the entity itself” (Vargo; Lusch, 2004, 283).

In the last few years the interest of scholars in the service innovation has led to an intense scientific debate which has been reflected in the increasing number and type of official research meeting (workshop, roundtable, conferences, special group of interest, special session, theme of annual conferences), as well as, in the increasing number of publication on the subject (Kindström; Kowalkowski, 2014). Specifically, Carlborg et al., (2014) in their recent contribution on Service Industries Journal highlighted that more than the 82% of papers on Service Innovation have been published over the past 10 years (e.g. 106 out of 128 papers published between the 1986 and 2010).

Contributions on Service Innovation are heterogeneous and show different perspectives. Some researches stressed the different degree of novelty between service innovation and product innovation: the former are incremental and less radical than product innovations (Johnes and Storey, 1998), and are less technology-based (De Brentani, 2001). Other studies (Edvardsson et al., 2010) stressed that Service Innovation processes are more difficult to be managed through a stage gate model, as they are less formal than product innovation processes. De Brentani (2001) pointed out the collaborative nature of Service Innovation stressing the role of human resources. The contributions that mainly emphasize the reach of Service Innovation come from scholars who framed the theory of innovation in a service context (Gallouj; Weinstein, 1997; Drejer, 2004; Michel et al., 2008) encompassing all types of innovation and challenging a view of innovation built on technology as the engine of renewal in society. According to the Service Science perspective, Service Innovation enables the value creation for all the actors involved in the business relationship (customers, employees, communities and all the stakeholders) (Moller et al., 2008; Bitner et al., 2008; Bettencourt, 2010).

Despite the top position in the research agenda, Service Innovation is poorly understood (Maglio et al., 2007). Studies are sparse (Ettlie and Rosenthal, 2011), and the terminology and labels are heterogeneous. A clear definition and a shared perspective of this research domain lack so far.

On the point some scholars claimed that we have no really systematic knowledge of what Service Innovation is and how it occurs (Sundbo, 1997) and called for further research (Ostrom et al., 2010).

This paper aims to contribute to the scientific debate bridging such a literature gap throughout the review and analysis of the literature on Service Innovation (Bitner et al., 2008). The paper seeks to summarize and classify extant research and to explain the main topics, and the relevance and the significance of various approaches used.

Particularly, its main objectives are: a) delineating the intellectual structure of research about Service Innovation as represented in the academic literature; b) identifying the different theoretical perspectives and common themes that characterize and define the Service Innovation literature and to highlight the connections between them; c) looking for emerging trends and gaps in the literature by comparing the most recent papers (published in 2014) to those representing the field's core.

The remainder of the paper is organized as follows. In the next section we present our literature review methodology. Subsequently, we outline the analysis, and the results. Finally, we present the conclusions of the paper with regard to research contribution and suggestions for future research.

2 Data and Methods

Our analysis follows mainstream methodologies of bibliometric technique: co-citation analysis (e.g., Acedo et al., 2006; Nerur et al., 2008). Co-citation analysis is used in information science to map the structure and the evolution of a research field. This technique is based on the idea that science has a structure that can be empirically defined by a measure based on the intellectual link between documents – the co-citation strength – that is equal to the number of documents that have cited a given pair of documents (Garfield, 1979; Small; Griffith, 1974). Co-citation strength is therefore interpreted as a measure of similarity of the ideas contained in the two documents. The study of its distribution and the analysis of the relationships between citing and cited publications allow scholars to describe the intellectual structure of a research area (McCain, 1990). The methodology we adopted is based on Garfield (1979) and Small (1987) technical descriptions of deriving co-citation maps. It involves two stage-process: the data collection and data analysis. The former relates to both the identification of a set of articles, which represent the intellectual core of the field, and the construction of the co-citation matrix containing a co-citation frequency for each pairs of article as a measure of their similarity. The latter relates to the application of three different multivariate statistical techniques: multidimensional scaling, cluster analysis and factor analysis (McCain, 1990). Over the past two decades the co-citation method has been applied across various research fields, such as, strategic management (Nerur *et al.*, 2008), consumer behavior (Hoffman; Holbrook, 1993; Galvagno, 2011), and organizational behavior (Culnan et al., 1990).

2.1 Data collection

The present study applies an *ad hoc* heuristic method to delimit the Service Innovation literature that includes both the pertinence and the relevance criterion. Data were selected from ISI Thomson Web of Knowledge by searching published articles (excluding proceedings, or working papers) in the fields of Business, Management and Operation Research with the words “service innovation*” or “nsd” or “new service development” or “innovation in service*” within title, abstract or keywords (*pertinence criterion*). The search generated a preliminary set of 399 articles published between January 1986 and June 2014.

Bibliometric methods ask for the selection of the articles representing the intellectual core of the field (*relevance criterion*). It is a critical step in the analysis. Indeed, the selection process has to ensure the full-compliance with two criteria: i) the core has to be as large as possible and ii) documents forming the core have to be truly important to the field. Previous studies have used a conventional measure to find the core, such as, the 100 most highly cited articles or those with at least 50 citations (Distefano, *et al.*, 2012; Ramos-Rodríguez; Ruíz-Navarro, 2004). Consistent with this approach only articles with at least 50 citations were selected. This threshold led us to identify a core set of 31 most influential contributions, which account for the 51% of the total number of citations collected by the original set of 399 articles (see Table 1).

Table 1. The set of articles.

#	Article	Citations	#	Article	Citations
1	Gallouj and Weinstein (1997)	295	17	Gadrey et al. (1995)	86
2	Barras (1986)	206	18	Neu and Brown (2005)	83
3	Atuahene-Gima (1996a)	193	19	Matthing et al. (2004)	81
4	Drejer (2004)	149	20	De Brentani (1995)	80
5	Edvardsson and Olsson (1996)	146	21	Alam (2006)	77
6	Menor et al. (2002)	143	22	Spohrer and Maglio (2008)	77
7	Sundbo (1997)	142	23	Bitner et al. (2008)	76
8	Ostrom et al. (2010)	136	24	Bullinger et al. (2003)	76
9	Hipp and Grupp (2005)	135	25	Berry et al. (2006)	75
10	Goldstein et al. (2002)	126	26	Menor and Roth (2007)	67
11	Maglio and Spohrer (2008)	120	27	Meyer and DeTore (2001)	59
12	Avlonitis et al. (2001)	116	28	Nijssen et al. (2006)	56
13	Alam (2002)	113	29	Oke (2007)	53
14	De Brentani (2001)	113	30	Kelly and Storey (2000)	52
15	Sirilli and Evangelista (1998)	97	31	Francis and Bessant (2005)	51
16	Atuahene-Gima (1996b)	87			

Each of the 31 articles was paired with every other article and the co-citation frequency of each pair computed from the total references received in ISI. The outcome of this process was a 31 by 31 matrix of co-citation counts. The next step

involved converting the co-citation matrix into a proximity matrix, using Pearson's correlation coefficients. This allows us to standardize co-citation data and to avoid possible scale effects.

2.2 Data analysis

First of all, we employed non-metric multidimensional scaling (MDS) in order to map relationships between the articles. Second, we applied a cluster analysis in order to identify a limited number of groups of papers which present characteristics that are highly coherent and significantly related to one another within each group, whilst notably different to the works belonging to the other groups. Finally, factor analysis was used to identify which papers make up each factor and their degree of contribution or loading as an approximation of the relative influence that each of them has within the research field.

The MDS allows us to project the papers on a two-dimensional map. Data from the correlation matrix have been processed through the ALSCAL routines of the SPSS statistical program. The values for goodness of fit (STRESS=0.19) and the explained variance (RSQ=90.0%) allow us to deem this representation as a good approximation of reality⁷¹. The purpose of this representation is twofold. On the one hand, the MDS shows co-citation links among articles: points (papers) positioned at the center of the map are linked to many different research themes and present, thus, an heterogeneous citation profiles. On the other hand, the MDS reduces data space. It places the articles on a bi-dimensional space, allowing the easier interpretation of the relative positioning of the clusters of contributions.

Next to MDS, a hierarchical cluster analysis with Ward's method was applied to data. This technique allows obtaining a series of groups of significantly related documents. Hierarchical clustering determines the belonging to a group by analyzing distance between pairs of documents in the multidimensional co-citation space. Dendrogram analysis and agglomeration schedule were used to choose how many clusters to keep. In order to better visualize and frame them in a conceptual space, the clusters were superimposed on the MDS graph.

Along with the two previous techniques, we also employed a principal component analysis of the co-citation matrix, with a varimax rotation, in order to reveal the 'hidden' subject matter. Yet, factor analysis can give us another piece of information regarding the structure of the field. If a structure is present in the data it will show by being decomposed in its constituent factors (i.e. common themes or research fronts). The relevance of factor analysis in this context is based on the notion that papers which are related to one another will, in general, be repeatedly cited together in subsequent publications, while works which are rarely or never cited together will not.

If this assumption is true, then factor analysis can use the co-citation entries to determine which contributions are grouped together and therefore share a common element. It does so by producing a number of 'factors', each of which captures a common element of the documents that are grouped together.

3 Results

3.1 Descriptive analysis

The most productive journals on Service Innovation (from 1986 to 2014) are Research Policy (5 articles), Journal of Product Innovation Management (4 articles), Journal of Operations Management (3 articles), International Journal of Service Industry Management (3 articles), Journal of Business Research (2 articles), Journal of Service Research (2 articles), Journal of The Academy Of Marketing Science (2 articles), Service Industries Journal (2 articles), and others with 1 article each (Table 2). At evidence, the debate has developed in the innovation and the service science literature, for the most part.

Table 2. Publishing Journals.

Journal	Number of articles	%
<i>Innovation Management Journals</i>	16	51.6%
Research Policy	5	16.1%
Journal of Product Innovation Management	4	12.9%
Journal of Operations Management	3	9.7%
International Journal of Operations & Production Management	1	3.2%
International Journal of Production Economics	1	3.2%
Production and Operations Management	1	3.2%

⁷¹ McCain (1990) suggests that if the STRESS value is less than 0.2 and the RSQ is higher than 85%, a two dimensional solution is a parsimonious one, which provides sufficient explanatory power.

Journal	Number of articles	%
Technovation	1	3.2%
<i>Service Journals</i>	7	22.6%
International Journal of Service Industry Management	3	9.7%
Journal of Service Research	2	6.5%
Service Industries Journal	2	6.5%
<i>Marketing Journals</i>	4	12.9%
Journal of the Academy of Marketing Science	2	6.5%
International Journal of Research in Marketing	1	3.2%
Industrial Marketing Management	1	3.2%
<i>Miscellaneous</i>	4	12.9%
Journal of Business Research	2	6.5%
California Management Review	1	3.2%
Mit Sloan Management Review	1	3.2%
Total	31	100.00%

With a publication rate of 51.6%, Innovation Management Journals are the most influential journals in the Service Innovation literature.

Results indicate a small prevalence of empirical articles using quantitative methods. Only two articles were published in practitioner-oriented journals.

3.2 Bibliometric analysis

The figure 1 shows the MDS map and the three clusters of papers obtained through the Ward's hierarchical method.

The map outlines: 1) positions of papers according to the map's axes; 2) identifiable paper groups which represent specific research perspectives or approaches; 3) location of these groups with respect to each other; 4) proximities of papers within groups and across group boundaries ('border papers'). Commentary on each point follows.

Although the construction of the axes is arbitrary, the position of the papers on the map suggests a meaning for them. Accordingly, we named "theoretical approach" the horizontal axis and "level of analysis" the vertical axis. Specifically, papers located on the left-hand side of the map (quadrant I) have a marketing approach (e.g. Matthing et al., 2004; Edvardsson; Olsson, 1996), while those located on the right-hand side of the map (quadrant III and IV) have a more service science approach (e.g. Maglio; Spohrer, 2008; Spohrer; Maglio, 2008; Bitner et al., 2008).

With respect to the vertical axis, papers on the top side of the map (quadrant III) focus on the definition and conceptualization of service innovation even if with different perspectives (e.g. Francis and Bessant, 2005; Drejer, 2004; Ostrom et al., 2010). Articles on the bottom side of the map (quadrants I and IV) focus on the different models of development of new services (e.g. Menor et al., 2002; Goldstein et al., 2002).

3.2.1 Cluster analysis

The hierarchical clustering method was employed to group papers together on the basis of their correlation relationships; thus, generally, papers within each group share the same perspective or research approach. Starting from the top right area and proceeding clockwise, the groupings derived from mapping are: (1) ***Service science***; (2) ***Innovation and technology management***; (3) ***New Service Development***.

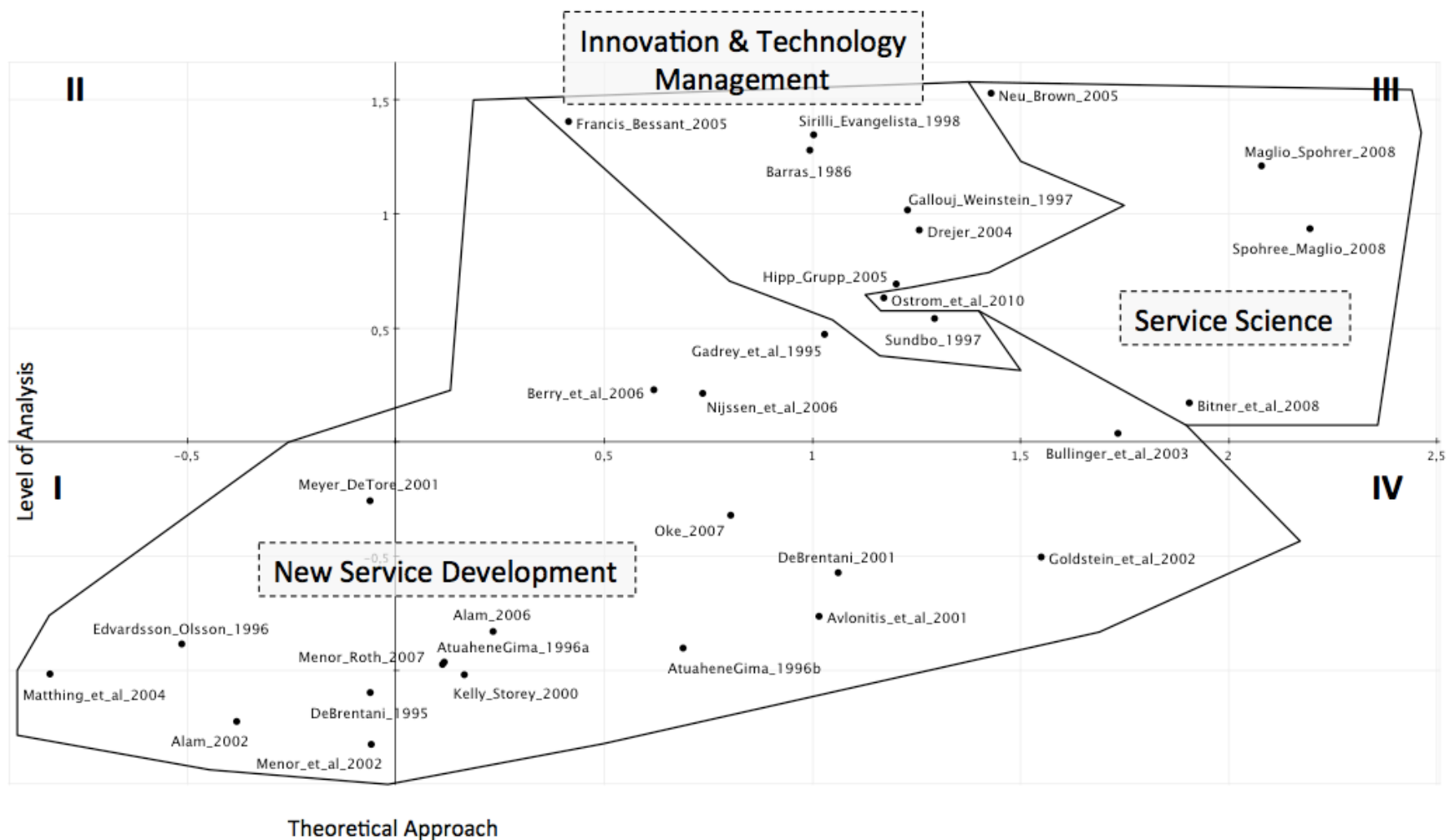


Figure 1. MDS map and Cluster.

Cluster #1: Service Science. It comprises five articles trying to set a research agenda for service science and including service innovation among the research priorities. Although articles in this cluster are frequently cited, their positioning on the map indicates that they cannot be identified as being central to the service innovation literature. Specifically, from the service science perspective, service innovation is seen at the core of the theoretical development of a science of service systems.

Cluster #2: Innovation and technology management. The seven articles within the cluster two are deeply influenced by the innovation studies. Articles in this group cover a variety of topics in the domain of economics and management of innovation. Most of them are indeed published in journals as Research Policy and Technovation with a management perspective on the construction of a theory of innovation in services. Cluster number two contains generally old articles, that represent what Carlborg et al. (2013) call “the formation phase”, trying to establish service innovation as a distinct research area. This cluster is weighted towards the papers with the greatest number of citations, containing 5 of the 10 most cited papers and encompassing almost the 40% of the citation total for the panel. This indicates that these are quite important papers within the body of service innovation research. Papers within this cluster are concerned largely with defining the research domain, giving theoretical frameworks and models that guide service innovation scholars.

Cluster #3: New Service Development. This group appears to be the structural center of the service innovation research domain. It contains the greatest number of articles in our panel (19 out of 31), and includes those papers adopting an ‘assimilation’ perspective (Coombs; Miles, 2000), trying to applying concepts related to the traditional product-centric orientation to services.

With respect to the position of each group, a not-surprising finding is the centrality of cluster #3. The reason, of course, is that almost all articles within these two groups pertain expressly to service innovation literature. Graphically, the proximity between group boundaries suggests the relatedness of their intellectual appeal to other research streams. For example, both the cluster #1 (Service Science) and cluster #2 (Innovation in Services) are concentrated in a small portion of space, their proximities reflect researchers’ strong tendencies to cite articles belonging two each cluster together. Differently, the position of articles belonging to the cluster #3 (New Service Development), are scattered over the space; it suggests that this cluster contain scholarly contributions from less related research streams. The centrality of a cluster – how closely it is positioned to the axes origin – suggests that the cluster’s articles are perceived to be of interest to many surrounding groups. Articles having positive correlation with other articles across cluster boundaries deserve further study. They generally create a bridge between two research perspectives and frequently borrow new ideas from other clusters to improve or extend the research of the cluster they belong to. The Ward clustering, for example, puts Gadrey et al. (1995) and Nijssen et al. (2006) in cluster #3 (New Service Development), but they are also high correlated with some articles in cluster #2 (Innovation in Services). The main reason being that, although they focus on New Service Development, both try to conceptualize innovation in services.

3.2.2 Factor analysis

The hierarchical cluster analysis placed the co-cited articles into mutually-exclusive clusters (Figure 1). It has been complemented by factor analysis to obtain additional information about the common themes researched within the service innovation domain. The co-citation entries are used in factor analysis to determine which articles share common elements, with each factor capturing a common element of the documents that are grouped together. Although using both cluster analysis and factor analysis may seem redundant, each technique offers some specificity that provides additional insights concerning relationships between the articles.

Table 3. Factor Analysis.

	F1 20.3%	F2 17.0%	F3 14.0%	F4 13.2%	F5 10.5%
Gallouj & Weinstein (1997)	.957				
Drejer (2004)	.938				
Barras (1986)	.925				
Sirilli & Evangelista (1998)	.908				
Hipp & Grupp (2005)	.847				
Sundbo (1997)	.795				
Francis & Bessant (2005)	.600				
Nijssen et al. (2006)	.555				
Avlonitis et al. (2001)		.923			
DeBrentani (2001)		.896			
AtuaheneGima (1996b)		.836			
Oke (2007)		.823			
Gadrey et al. (1995)	.521	.597			
Berry et al. (2006)		.587			
Kelly & Storey (2000)		.583		.412	
Goldstein et al. (2002)			.937		
Edvardsson & Olsson (1996)			.841		
Bullinger et al. (2003)			.838		
Menor et al. (2002)			.807		
Menor & Roth (2007)			.720		
Meyer & DeTore (2001)			.611		
Alam (2002)				.951	
Matthing et al. (2004)				.910	
Alam (2006)				.824	
AtuaheneGima (1996a)		.407		.603	
DeBrentani (1995)		.499		.573	
Maglio & Spohrer (2008)					.875
Ostrom et al. (2010)					.867
Spohree & Maglio (2008)					.764
Bitner et al. (2008)					.747
Neu & Brown (2005)					.593

* Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser normalization. Rotation converged in 6 iterations.

The strength of factor analysis relates to its ability to detect common, underlying dimensions on which variables or objects may be located, while the strength of cluster analysis method lies in its ability to indicate group membership. In this study, we use cluster analysis to identify different research approaches or perspectives featured the service innovation literature, whereas we use factor analysis to highlight the common themes on which scholars speculate and discuss. Articles dealing with the same topic or theme will tend to contribute more frequently to a specific factor (McCain, 1990) and factor loadings indicate the degree to which an article belongs to or loads on that factor.

Interestingly, factor analysis presents several “cross-boundary” groupings, not captured by the cluster analysis or shown on the map. To include a contribution in a trend, its loading has to be equal to or greater than 0.4. Papers have a great relevance to the corresponding approach if the loading is greater than 0.7. The resulting model produced five factors (see Table 3), explaining more than 75.0% of the total variance. All 31 papers loaded on at least one factor. Significantly, almost the 70.0% of the contributions are loaded with a weight greater than 0.7. This data corroborate the relevance of these works within their respective approaches. Likewise, it can be observed that a small number of works exhibit considerable loading in more than one factor (Atuahene-Gima, 1996a; DeBrentani, 1995; Gadrey et al., 1995; Kelly and Storey, 2000). These works are of even greater interest, as they bridge two or more researched themes, and allow us to observe a broader spectrum of influences among different topics, thus helping us to understand their evolution and the ties.

The factor analysis results allow us to define the relevance of the articles in terms of scholarly contribution and intellectual associations.

Cluster analysis produced three different perspectives that characterized research on Service Innovation; factor analysis interprets the intellectual connections among these articles. After analyzing the loadings on each factor, we named the five factors: (1) *innovation in services*; (2) *new service development critical success factors*; (3) *new service development process and models*; (4) *customer interaction and involvement*; (5) *Service Logic: conceptualization and setting*.

Factor 1: Innovation in Services. This factor groups eight articles of our sample and explains the 20.3% of the variance. It encloses studies aiming to provide a general theoretical approach for the conceptualization (Drejer, 2004;

Gallouj and Weinstein, 1997; Barras, 1986) of innovation in services from an economics, management and policy point of view. Along these lines, a first group of papers takes a closer look at the technological innovation in the service sector (e.g., Gallouj and Weinstein, 1997; Barras, 1986) and its effects on the economics system as a whole. Another group of papers try to extend measures and concept developed for the manufacturing sector to the service sector (Sirilli and Evangelista, 1998; Hipp and Grupp, 2005; Njssen et al., 2006). Other topics covered by contributions loading on this factor include issues of management of innovation in services (Sundbo, 1997) and the application of the Schumpeterian perspective to innovation in services (Drejer, 2004). These studies address the need of the academia for theories applicable to services, and are complemented by empirical based contributions that provide a taxonomy of both innovation in service (Sirilli, Evangelista, 1998; Hipp, Grupp, 2005; Francis and Bessant) and of service companies (Sundbo, 1997). Innovation in services encompasses both the technological and non-technological (Drejer, 2004; Sirilli, Evangelista, 1998; Hipp, Grupp; Barras, 1986) perspective and reveal the prevalence of an integrative approach to innovation (synthesis) able to account for an enlarged view of innovation (Gallouj 1994, Coombs and Miles, 2000, Carlborg et al. 2013).

Factor 2: New service development critical success factors. This factor groups seven articles and explains the 17% of the variance. It encloses studies built on the traditional product-centric orientation and on the idea of product as the primary economic driver. Studies loading on this factor relate to the traditional and well-established New Product Development research stream; they try to extend this perspective to the service sector and to service firms, by reflecting the transition phase from the new product development to the new service development. Papers within this factor embrace a narrow set of NSD topics, such as the critical success factors, which were mainly investigated through large-scale surveys within the financial services industry (Avlonitis et al., 2001; De Brentani, 2001; Atuahene-Gima, 1996a; Oke, 2007). Specifically, a first group of papers emphasize the relationship between the degree of innovativeness and the service business performance (Avlonitis et al., 2001; De Brentani, 2001; Atuahene-Gima, 1996a; Oke, 2007). Other studies outline the key role of ICTs in transforming service activities (Gadrey, et al., 1995), as well as, the positive relationship between the presence of a formal NSD process and the NSD performance (Kelly; Storey, 2000) or the development of an organizational culture to support the human performance and the service innovation (Berry et al., 2006). These contributions, although with a more or less intensity, reveal the prevalence of a demarcation approach to innovation, and thus that new services should be developed differently than new tangible products (Coombs and Miles, 2000, Carlborg et al. 2013). This stream of research is essentially characterised by the attempt to study the relation between the NPD and NSD in order to identify critical success and failure, as well as, their effects on the NSD performance from an operation management perspective, as revealed by the analysis of the journals.

Factor 3: New service development process and models. This factor includes six articles and explains the 14.05% of the variance. Articles embrace a recurring and well-established pattern of research in NSD, addressing the need of both academic and practitioner to systematize the NSD process. Studies loading on this factor focus on the conceptualization and definition of models for the NSD both from a technical-methodological approach (service engineering) (Bullinger et al., 2003) and from a marketing oriented perspective (Edvardsson, Olsson 1996; Menor, Roth, 2007; Meyer, De Tore, 2001). Some authors strongly focused on rules and procedures to guide the NSD process (Meyer; De Tore, 2001), whereas other provided a diagnostic tool to assess the organizations' innovative capability (Menor; Roth, 2007). Four on six contributions (Bullinger et al., 2003; Goldstein et al., 2002; Menor et al., 2002; Edvardsson, Olsson 1996) refer to the new challenging and promising research area of service design (Menor et al., 2002) and acknowledge the service concept like the common feature of both the service design (Goldstein et al., 2002; Menor et al., 2002; Edvardsson, Olsson 1996) and the service quality (Edvardsson, Olsson 1996). This stream of research is essentially characterised by the attempt to define procedures, methods and tools to systematise both the design and the development of services. Similarly to the factor 2, an operation management perspective marks out papers loading on factor 3.

Factor 4: Customer interaction and involvement. This factor includes five articles and explains the 13.01% of the variance. It shows an extension of the research toward the most recent topic of the customers involvement in the innovation process. Studies loading on this factor acknowledge, however, in a more or less explicit manner, the consumers' input as innovative and the interaction as both the focal point of services and the essence of customer involvement (Matthing, et al., 2004; Alam, 2002, 2006; Atuahene-Gima, 1996b; De Brentani, 1995). Most studies are characterized by a normative approach strictly focused on the customer interaction and involvement (e.g. definition of a set of activities and procedure for involving users in a new service development program) (Matthing, et al., 2004; Alam, 2002, 2006; De Brentani, 1995), whereas the contribution from Atuahene-Gima (1996b) investigates, in a more general manner, the effects of a market orientation on innovation in manufacturers and service firms. Most studies of our sample relate the B2B service context (e.g. financial, high-tech transportation and communication) and a qualitative research design. Different from the latest studies on the customer engagement (Verhoef et al., 2010; Brodie, et al., 2011) contributions we focused on outline a company centric perspective. This research theme is essentially characterised by the attempt to operationalize and implement the market orientation approach to satisfy the customers' needs. Both an organization and operational management focus feature contributions loading on factor 4.

Factor 5: Service Logic conceptualization and setting. This factor includes five articles and explains the 10.06% of the variance. It outlines diversified patterns of research pivot on the latest perspective of service science. Studies loading on this factor claim for service as broad, interdisciplinary, and cross-functional service research discipline in its own right (Spohrer; Maglio, 2008); they conceptualise service as the application of competences for the benefit of

another (Vargo; Lusch, 2004) and call for its scientific understanding (service science) to advance the ability to design, improve, and scale service systems (Ostrom, 2010; Maglio; Spohrer, 2008; Spohrer; Maglio, 2008). Studies range from the conceptualization of a service science theory (Maglio; Spohrer, 2008) and the definition of a model for the systematic development of service innovation in practice (Bitner et al., 2008) to the setting of a research agenda (Ostrom, 2010). This factor provides both a conceptual and a practical perspective on the service science, by addressing all the patterns of the research on service innovation we previously identified. It accounts not only for new and emerging topics, such as, service system, service dominant logic (SDL) and value co-creation, but for a new multidisciplinary approach to service and service innovation. Accordingly, service innovation seems to be an established area of research with a specific and different focus from studies on the innovation in service context and NSD-related topics.

The analysis of the interaction between the factors (common themes) and the clusters (research approaches), shows the dominant position of the new service development approach within the Service Innovation research (#2, #3, #4). Innovation and technology management theory is at the base of the innovation in services theme (#1), and service science approach is related to the #5.

Table 4. Distribution of articles by common themes and research approaches.

Common Themes (Factors)	Research Approaches (Cluster)			Total
	Innovation & Technology Management	New Service Development	Service Science	
#1 Innovation in services	7	1	--	8
#2 new service development critical success factors	--	7	--	7
#3 New Service Development processes and models	--	6	--	6
#4 Customer interaction and involvement	--	5	--	5
#5 Service Logic conceptualization and setting	--	--	5	5
TOTAL	7	19	5	31

3.2.3 Emerging trends

To identify emerging trends and gaps in the literature, we compared the most recent papers (published in the first semester of 2014) with those representing the core of the literature, and assigned them to the common themes that the factor analysis identified. Following Acedo and Casillas (2005), an article was assigned to a common theme if it cited at least two of the core papers in that topic. If a paper cited two or more papers from more than one topic, it was assigned to the most-cited one. In line with Boyack and Klavans (2010), we also employed a partial assignment method: a paper was proportionally assigned to various topics according to the number of papers cited from each of them. The Table 5 shows the articles published on Service Innovation in 2014. 21 of the 29 articles (72.0%) were assigned to one or more topics, 23 articles (79.3%) cited at least one paper from the core, while 6 (20.7%) did not cite any papers from the core.

Most of recent research on Service Innovation belongs to the foundational theme of *innovation in services* (#1)(around 27.6% of the assignments). Further, one of every five papers deal with the customer interaction and involvement topic (#4), which also underlines the significant expansion of the marketing perspective within the service innovation studies. Therefore, among Service Innovation scholars, Gallouj and Weinstein (1997) and Alam (2002) articles are definitely more popular than Maglio and Spohrer (2008) or Spohrer and Maglio (2008). The topic related to the *service logic* represents only a very small share of the assignments (around 7%). This limited allocation emphasizes the role of innovation management and New Service Development approaches (on the left and centre of the map) in the Service Innovation literature in comparison to the service science one (on the top-right corner of the map).

Table 5. Articles Published on Service Innovation in 2014.

Common themes and topics of Service Innovation research	Assigned papers*		Partially assigned papers**		Total
#1 Innovation in services	4	13.8%	4	13.8%	27.6%
#2 Critical success factors of new services	1	3.4%	2	6.8%	10.2%
#3 New Service Development processes and models	-	-	2	6.8%	6.8%
#4 Customer interaction and involvement	5	17.2%	1	3.4%	20.6%
#5 Service Logic Conceptualization and setting	-	-	2	6.8%	6.8%
Not assigned, but cites papers from the core	8	27.6%			
No citations to any core papers	6	20.7%			
* A paper is assigned to the cluster from which the highest number of references is derived (at least two or more).					
** A paper is assigned to various clusters in proportion to the references derived from each cluster.					

4 Concluding remarks and suggestions for further studies

Studies of services and especially the study of Service Innovation are moving to center stage (Spohrer; Maglio, 2008) in an attempt to become a research discipline in its own right (Tronvoll, et al., 2011). Despite that, and the great effort of leading scholars in clarifying and classifying Service Innovation, it seems to be poorly understood (Gadrey; Savona 2009). Much researches on Service Innovation literature has taken a considerable number of distinct research fields, deep-rooted in a good dominant logic perspective: “*the constructs service development and service innovation have been used interchangeably in past research*” (Menor, et al., 2002).

This study addresses the call of the academia for a comprehensive understanding of Service Innovation (Barras, 1986). It provides a systematic review by delineating the intellectual structure of the Service Innovation research within the academic literature.

According to Menor et al. (2002) and to previous studies (Morrar, 2014; Carlborg et al., 2013; Papastathopoulou; Hultink, 2012; Droege et al., 2009; Gallouj; Savona, 2009), data were selected by searching publications with title, abstract, and keywords containing the keyword “innovation in service*”, “service innovation*”, “new service development*” and “NSD” in “ISI Web of Knowledge”.

However, differently from the reviews cited above, both a quantitative and a qualitative approach addressed our study.

The former relates to a bibliometric method, and specifically, the co-citation analysis to the most influential articles regarding service innovation. Furthermore, a rigorous statistical approach and three different multivariate statistical techniques (e.g. non-metric multidimensional scaling, cluster analysis and factor analysis) have been adopted to map relationships among articles, to group the articles in terms of topic’s similarities and to associate single articles with a given approach. Finally, the qualitative evaluation of the full papers has been conducted through the content analysis, in order to systematically categorize each article according to the content of its main topic.

Previous contributions outline the evolution of thinking about the topic according to temporal framework and from the prevailing perspectives of assimilation, demarcation, and synthesis (Morrar, 2014; Carlborg et al., 2013; Droege, et al., 2009; Coombs; Miles, 2000; Gallouj, 1994). Although, the above cited perspective provide an helpful guidance for understanding the Service Innovation, they cannot serve as determinant parameters to divide the different phases of the research on the topic (Carlborg et al., 2013).

The quantitative and qualitative analysis we conducted, allow us to identify three research perspectives/approaches (clusters) – Service Science, Innovation and Technology Management and New Service Development – and five common researched themes (factors) – Innovation in Services, Critical Success Factors of NSD, NSD Process and Models, Customer Interaction and Involvement and Service Logic Conceptualization and Setting.

Not surprisingly, the MDS technique places the Service Science cluster on the edge of the map, proving that, it cannot be considered as a central perspective to the Service Innovation literature. Because of the most recent diffusion of the topic, this result might seem obvious. However, this same trend will mark out the further studies on the topic, as the analysis of the emerging trends in the Service Innovation literature confirmed (p. 14). The Innovation and Technology Management cluster groups quite important papers within the body of Service Innovation research. It represents “the formation phase” (Carlborg et al., 2013), by embracing less recent articles trying to establish Service Innovation as a distinct research area. The MDS map reveals the researchers’ strong tendencies to cite articles belonging to these clusters together (cluster proximity). By including the 61% of the articles in our panel (19 out of 31), the New Service Development cluster represents the structural center of the Service Innovation research domain. It embraces scholarly contributions from less related research streams (articles are scattered over the map), representing a research discipline in its own right.

Studies loading on factor 1 (Innovation in Services) provide a general theoretical approach for the conceptualization of innovation in services addressing the need of the academia for theories applicable to services. With the exception of the contribution from Nijssen et al., (2006), all the articles loading on this factor belong to the cluster Innovation and Technology Management. Studies loading on factors 2, 3 and 4 (Critical Success Factors, NSD Process and Model and

Customer Interaction and Involvement) are essentially characterised by the attempt to identify conditions, procedures and methods to systematise both the design and the development of services, according to a market orientation approach. All the articles loading on these factors belong to the New Service Development cluster. They outline different phases within the NSD research moving from “a transition stage from NPD to NSD” (factor 2), to “an entrenchment stage of NSD” (factors 3) with a significant expansion of the marketing perspective within the service innovation studies (factor 4). This latter trend is confirmed by the analysis of the emerging topics and the related increasing interest of scholars toward the customer interaction and involvement.

Studies loading the factor 5 (Service Logic Conceptualization and Setting) account for a new multidisciplinary approach to service and Service Innovation. All the articles loading on this factor belong to the Service Science cluster. They provide both a conceptual and a practical point of view of Service Science, covering its evolutionary process from a broad range of topics and phases.

Overall, besides the elements considered above, the analysis leaves us with the following issues regarding some research gaps and indicating possible directions for the development of a Service Innovation theory:

- The empty area in quadrant II on the map suggests that studies conceptualising Service Innovation in a marketing perspective are missing.
- Most of the empirical and theoretical research on Service Innovation concentrates on business-to-business settings, while a business-to-customer context should also be considered.
- The Service Science perspective is rarely acknowledged.

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Path dependencies between centralized and decentralized innovation processes: A systems thinking approach

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Abstract – In this paper we compare centralized and decentralized innovation approaches and industry structures. We elaborate this comparison first by drawing basis from related innovation, marketing, service and platform literature. We use qualitative level system dynamics to showcase the potential path dependency on both approaches. Furthermore, we hypothesize that, on an overall level, Finnish export industry is currently locked in a self-reinforcing cycle of a centralized approach and discuss different trends that could reverse this cycle and shift the industry towards a more decentralized path.

1 Introduction

Centralized and decentralized organizational structures have been with us for ages and we can witness them in all walks of life. The classical example of these is the comparison between a pyramid which is constructed with a centralized mechanism and an ant heap that emerges on its own in a decentralized manner. Similarly, innovation approaches and market structures can follow more centralized and decentralized processes. Centralized processes have typically been used by corporations with large R&D departments that produce incremental innovations in a cyclical manner through so called stage-gate processes. On the other hand, especially the wide scale diffusion of the Internet has increasingly promoted more decentralized and agile innovation processes driven by smaller actors, and large crowds and communities. There innovations emerge spontaneously in a bottom-up manner which in turn is an especially good environment for growth seeking entrepreneurs.

A similar polarization can also be seen in different literatures. This kind of a division can be observed e.g. between different types of innovation, i.e. between incremental and radical innovation (Anderson; Tushman, 1990) and between the so called predictive and effectual approach for building a business (Read et al., 2009; Brettel et al., 2012). This polarization can also be seen as reflecting the seminal work of Vargo and Lusch (2004) and their original distinction between a Goods-Dominant logic (GDL) and Service-Dominant logic (SDL) where in the former customers are seen as passive entities and in the latter as active participants in value creation.

This distinction can also be a useful way to examine the structure of industries. For example, the Finnish national economy has a large dependency on export (MEE, 2014), but the export industry has been and is currently dominated by large corporations and thus reflects rather centralized processes. For example it has been recently estimated that ten of the largest companies make up for one third and one hundred of the largest companies two thirds of Finnish exports (EVA, 2014). At the same time it has been recognized that in the future greater potential for growth in exports will come from more decentralized structures, i.e. small and medium enterprises (SMEs) seeking global level business (MEE, 2013). While promising trends such as an increasing number of innovative start-ups is observable, overall the Finnish export industry still seems to be locked in a rather centralized structure.

The objective of this paper is to compare centralized and decentralized innovation approaches and industry structures and examine how a shift towards more decentralized and agile innovation processes could occur. The goal is to elaborate this comparison by drawing basis from related literature and by taking a systems thinking approach. Using system dynamics (Sterman, 2000), a high level feedback structure is constructed, which describes how an industry and the corresponding innovation processes can become locked either

1. to a path following a centralized top-down design model corresponding to a predictive approach or
2. to a more decentralized bottom-up agile path corresponding to an effectual approach.

Furthermore, based on this, our aim is to form a hypothesis that, on an overall level, Finnish export industry is currently locked in a self-reinforcing cycle of a centralized approach. Our goal is also to discuss different trends that could reverse this cycle and shift the industry towards a more decentralized path.

The rest of this paper is structured as follows. In section 2 we conduct a brief review of centralized and decentralized innovation approaches and market structures in relevant literature. In section 3 we give a short introduction to system dynamics and construct a qualitative feedback model to showcase the potential path dependency either on a centralized or decentralized process. In section 4 we apply this model to the Finnish export industry, discuss how it seems to be locked on a centralized path and discuss different trends that could reverse this path. Finally in section 5 we draw conclusions.

2 Centralized and decentralized innovation processes and market structures

Centralized and decentralized innovation processes and the revolving cycle between these can be seen in a large body of scholarly work. Foundations for such examinations are often traced back to the work of Schumpeter (1942) who describes the concept of creative destruction where innovative entry of entrepreneurs is the force that destroys monopoly power derived from previous technological and economic paradigms, and sustains long-term economic growth. Especially industries, that are dominated by increasing returns (i.e. where economies of scale and network externalities are strong), can become locked into one dominant design (Arthur, 1990) after which the cost of switching become prohibitive, and a lock-in persists until an architectural shift or large external shock renders the dominant design obsolete (Sberman, 2000).

The cyclical nature has been characterized as a cycle of technological change (Anderson; Tushman, 1990) where technological breakthrough, or discontinuity, initiates an era of decentralized technical variation and selection that in turn proceeds to the selection of a single dominant design followed by a period of more centralized incremental technical progress. This model has also been extended to describe how systems and products evolve in the form of a layered hierarchy of technology cycles where some parts follow more centralized and some more decentralized processes (Murmman; Frenken, 2006). More broadly, similar considerations have been made on a socio-technical level by Geels and Schot (2007) who describe how such transitions and system changes could occur.

The distinction between centralized and decentralized structures can also be observed in innovation literature where a division is typically made between incremental and radical innovation. Henderson and Clark (1990) broaden the categorization to four types of technological change: incremental innovation, architectural innovation, modular innovation, and radical innovation. The more radical, disruptive innovation has been further categorized into high-end and low-end disruption by Christensen (1997) who describes how companies can become locked to making incremental improvements to their products whose value can in turn be difficult for consumers to adopt and which can thus be disrupted e.g. by more affordable low-end products and technologies.

This polarization between centralized and decentralized structures can also be observed in marketing and service literature. It can be seen as reflecting the seminal work of Vargo and Lusch (2004, 2008) and their original distinction between a Goods-Dominant logic and Service-Dominant logic. They for example characterize that from the point of view of GDL the goods should be standardized and produced away from the market whereas SDL focuses more on cultivating relationships that involve the customers in developing customized, competitively compelling value propositions to meet specific needs. In GDL customers are seen as passive entities and in SDL as active participants in value creation (Vargo and Lusch, 2004)

As it relates to different approaches to building a business a similar distinction has been pointed out by Read et al. (2009) who found that people without entrepreneurial expertise rely primarily on predictive techniques, whereas expert entrepreneurs tend to invert these and use an effectual or non-predictive logic to tackle uncertain market elements and co-construct novel markets with committed stakeholders. This distinction between a predictive and effectual approach has been further characterized in the context of corporate R&D by Brettel et al. (2012) who concluded that the predictive approach is beneficial in projects with low levels of innovativeness whereas effectuation is positively related to success in highly innovative contexts.

Furthermore this division is observable in platform literature (Iansiti; Levien, 2004; Eisenmann et al., 2006; Gawer; Cusumano, 2008) where platforms are typically described as centralized elements (e.g. Microsoft Windows or Google Android operating system) that serve as a mediator for more decentralized innovation by the users of the platform (e.g. software developers, hardware vendors and end-users etc.). Centralized structures often relate to capital intensive industries with long investment and development cycles whereas decentralized structures to industries where the development cycle is much shorter such as consumer goods and services. For example as it relates to wireless communications, mobile cellular network infrastructure corresponds to large scale infrastructure with long investment cycles whereas Wi-Fi access points to more emergent bottom-up way of building wireless connections (Casey, 2013). Another concrete example is different software development processes where the so called waterfall model corresponds to a more centralized structure whereas agile methods, such as scrum, correspond to more decentralized structures.

The centralized and decentralized nature of innovation processes and industry structures can also be modeled with dynamical systems theory (Ali-Vehmas; Casey, 2012). Centralized top-down design value creation mechanisms can be seen as following so called fixed point and limit cycle attractors (Strogatz, 2001) corresponding to systems that have fixed or tightly coupled elements and rather static or cyclical behavior.

Decentralized innovation processes on the other hand can be characterized with a so called strange attractor and correspond more to complex adaptive systems that consist of loosely coupled elements. Complex adaptive systems have a large number of interacting and learning agents, are quick to adapt to new circumstances, and are constantly evolving and unfolding over time (Arthur, 1999). Such systems are commonly described to be exhibiting spontaneous order and working on the edge of chaos. Examples of such decentralized systems are stock markets, ant colonies and the Internet and their structure typically reflects a scale-free structure that follows a power-law (long tail) distribution (Barabási; Bonabeau, 2003). An illustration of this phenomena has been described by Anderson (2006) who characterizes how a long tail distribution of content, products and services is observable in the Internet because the tools of service production and distribution are democratized and supply and demand are connected. This in turn enables mass tailoring and in principle a so called segment of one.

Furthermore, it can be seen that the S-D logic reflects, at least partly, these kinds of decentralized loosely coupled structures as pointed out by Vargo and Lusch (2011) in their consideration of service ecosystems:

However, S-D logic, with its focus away from optimization to learning in a dynamic, changing environment, points toward a need to think about value creation taking place in and central to the emergence and evolution of service ecosystems. A service ecosystem is a spontaneously sensing and responding spatial and temporal structure of largely loosely coupled, value-proposing social and economic actors interacting through institutions, technology, and language to (1) co-produce service offerings, (2) engage in mutual service provision, and (3) co-create value.

3 Feedback model of path dependency on centralized and decentralized innovation approaches

Following these observations, we now move on to constructing a high level qualitative system dynamics model and try to depict a potential system level path dependency on:

1. a centralized approach where value is created and needs are met mostly by centrally planned efficient incremental processes and by leveraging economies of scale or,
2. a decentralized approach where value is created and needs are met by tailoring services for individual needs and by enabling increased end-user value co-creation and choice.

Next, we will first give a short introduction to system dynamics and then present the model.

3.1 Introduction to system dynamics

System dynamics seeks to explain phenomena by modeling the feedback structure of a system. Overall, system dynamics takes an endogenous approach to modeling (the word endogenous means arising from within), where endogenous structure generates the dynamics of a system through the interaction of variables and actors (and their mental models) represented in the model. This modeling approach differs from methods relying on exogenous variables (variables arising from without) which explain dynamics in terms of other variables whose behavior is assumed (Sterman, 2000).

System dynamic diagrams depict the feedback structure of a system with positive and negative causal links and with stocks, flows and delays. The causal links form reinforcing and balancing loops which are the most basic feedback structures. These can be furthermore combined to generic structures known as system archetypes (Senge, 1990; Wolstenholme, 2004), one of which we will apply in our modeling.

In system dynamic models a positive causal link (+) indicates that two variables change in the same direction whereas a negative causal link (-) indicates that two variables change in opposite direction. Reinforcing loops (R) have an even number of negative links and balancing loops (B) an uneven number of negative links.

3.2 System dynamics model

The system dynamics model presented here is based on the shifting the burden archetype (Senge, 1990) and depicts on an overall level the opposite paths of a centralized and decentralized innovation approach an industry can take. In the model in Figure , the need for value creation (i.e. the need to put resources such as workforce or capital to use) can be addressed by creating value through centralized planning and economies of scale (i.e. capital intensive long term investments) which subsequently leads to meeting basic consumer needs (e.g. utility services). This in turn reduces the need for value creation and results in a balancing loop 'B-predictive approach'.

On the other hand, value creation through centralized planning and scale means that the system overall will become more centralized and the market will be concentrated to few larger corporations, and resources and workforce will be aggregated. This in turn means that less value creation will occur through decentralized co-creation which subsequently leads to a lower possibility for meeting individual end-user needs. The inability of the system to meet individual needs subsequently leads to a reinforcing loop ('R-Centralization of the system') that can lock the system on a path of creating value through centralized planning and scale. Overall, such a system is characterized by incremental innovation, extensive use of the predictive approach, GDL mentality, long term investments, capital intensive way of working and a small number of large (tightly coupled) actors. End-users remain here as passive entities that consume the basic good or service provided.

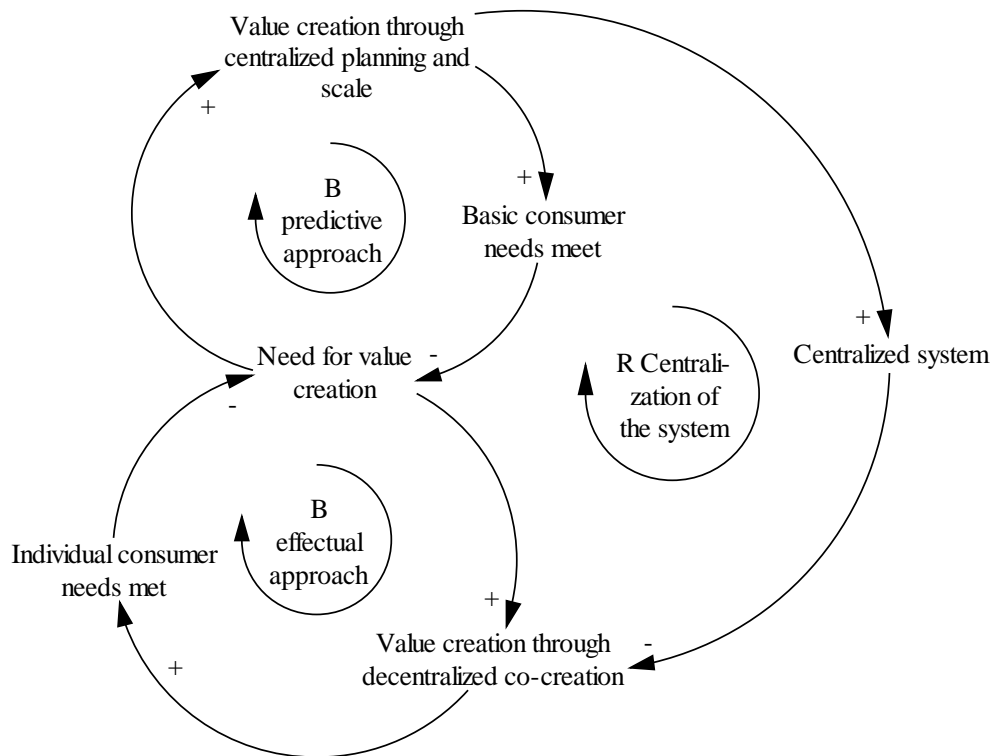


Figure 1. Qualitative system dynamics model depicting a path dependency on either a centralized predictive approach or a decentralized approach (adapted from Senge (1990)).

An opposite path can be observed if a more decentralized effectual approach is chosen where the need for value creation is fulfilled through decentralized co-creation. This subsequently leads to more tailored services and meeting individual end-user needs and in turn to less of a need for value creation and a balancing loop 'B effectual approach'. When value is created by serving individual consumer needs it leaves a smaller space for value creation through centralized planning and economies of scale. This subsequently leads to a less centralized system where smaller players (e.g. SMEs and individual software developers) have a larger role, resources and tools of service production and distribution are democratized, more decentralized forms of funding (such as venture capital) exists and in general workforce is more decentralized. This subsequently leads to more value creation through decentralized co-creation and meeting individual end-user needs. This in turn leads to a reinforcing loop ('R Centralization of the system') that works in the opposite direction when compared to the predictive approach and can lock the system on a path of creating value through a more decentralized and effectual approach.

Such a system is characterized by radical innovation, dominance of the effectual approach, SDL mentality, low cost of technology and tools of service production (e.g. the Internet), short development cycles for products and services and in general by loosely coupled adaptive actors and innovative entrepreneurs. End-users are active participants and plenty of two-way interaction exists.

4 Case: Finnish export industry

Next, utilizing the model above we hypothesize that, on an overall level, Finnish export industry is currently locked in a self-reinforcing cycle of a centralized approach. Figure 2 represents a visualization of the self-reinforcing positive feedback loop 'R Centralized system' depicted in the system dynamics model above in Figure 1. The ball sliding down the hill symbolizes the self-reinforcing mechanism of the path taken and the top of the hill a tipping point which needs to be reached in order for the self-reinforcing mechanisms to start working in the other direction.

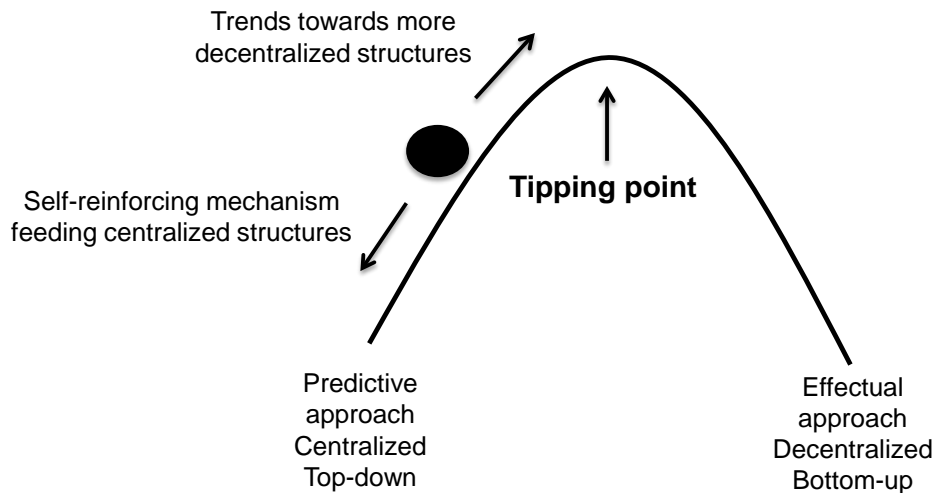


Figure 2. Visualization of the self-reinforcing dynamics between a centralized and decentralized approach.

Our hypothesis is that the Finnish export industry is currently locked on a path of a centralized predictive approach where large corporations focus on building and exporting large scale investment goods with long investment and development cycles. We also discuss different trends that could reverse this cycle, so that a tipping point could be reached and a shift towards a more decentralized path could occur.

4.1 Current locking to a centralized path

Overall, the Finnish national economy has a large dependency on export. Roughly stated it can be argued that the Finnish export industry has been and is currently dominated by large corporations. For example it has been recently estimated that ten of the largest companies make up for one third and one hundred of the largest companies two thirds of Finnish exports (EVA, 2014). Furthermore, while small and medium enterprises also exist in the export industry, majority of these are mainly serving larger corporations producing investment goods (MEE, 2014).

The three core pillars for export in Finland have traditionally been the forest industry, the mechanical engineering industry and the electronics industry. The forest industry is dominated by three companies: UPM, Stora Enso and Metsä Group. The mechanical engineering industry in turn is largely driven by seven companies: KONE, Cargotec, Konecranes, Wärtsilä, Outotec, Sandvik and Metso. These seven companies represent 70% of all revenue in the industry (MEE, 2014). A large number of SMEs also exist in the mechanical engineering industry (which has a total of 9000 companies altogether) but the SMEs typically work as subcontractors for the leading companies with only 300-400 having their own products (MEE, 2014).

The electronics industry on the other hand has been dominated by Nokia but has lost a significant part of its revenue due to Nokia's recent difficulties. Overall significant structural changes are ongoing especially in the forest and electronic industry where both have been driven by flagship companies which have had little desire or ability to seize small-scale economic potential (MEE, 2013).

Finland has also rather centralized job markets. After the Second World War, the influence of the government on labor market activities has been significant. Since the end of the 1960's, labor market relations have been shaped towards a tripartite cooperation, i.e. centralized economic corporatism based on tripartite contracts of business, labor, and state. Subsequently, during the last decades the labor market system has become an important national institution and an important basis for the welfare state policy (MOL, 2006). Overall, private sector jobs are heavily biased towards employment by large corporations (EVA, 2014).

At the same time, largely because of this centralized nature of the system, it has been rather difficult and unpopular to establish growth seeking small businesses. For example during the recent years just a few companies have been enlisted to Helsinki stock exchange which is an indication that there have not been many companies seeking growth (Talouselämä, 2011). Also, traditionally, funding for growth seeking SMEs has been challenging and bank centric funding to large corporations has been the norm (EVA, 2014).

Thus it can be argued that, overall, the Finnish export industry has traditionally and is still reflecting a more centralized, predictive, goods dominant logic. Roughly put, one could argue, that the self-reinforcing mechanism 'R-Centralization of the system' depicted in Figure 1 has locked the system on a path of creating value through centralized planning and scale. Therefore, the traditional Finnish export industry can in many ways be characterized by incremental innovation, extensive use of the predictive approach, GDL mentality, long term investments, capital intensive way of working and a small number of large (tightly coupled) actors in the lead.

4.2 Possible shift to a decentralized path

While traditionally Finnish export industry has been dominated by a more centralized approach there are many ongoing trends that could reverse this path. For example, recently, there has been a significant increase in the number of growth seeking SMEs in Finland. This has been driven especially by an emerging vibrant start-up scene where Finland is becoming one of the start-up hubs of northern Europe (Wired, 2013; Techrepublic, 2014). This recent development has been fueled particularly by entrepreneur communities such as Aalto Entrepreneurship society, start-up sauna and large scale events such as Slush⁷².

Furthermore, what is observable now, is that becoming an entrepreneur is increasingly becoming an attractive option for young graduates (Kauppalehti, 2014). Also plenty of skillful engineering force has been released from Nokia due to its difficulties and many have founded their own company.

Venture capital funding is also becoming all the time more available and Finland is among top European countries especially when comparing venture capital investments to the gross domestic product (EVA, 2014). Recently, Finland came in at third place – behind the UK and France – for equity financing in Europe with a 12 per cent share of all investment into European venture capital-backed companies (Venture village, 2013).

The startups are typically driven by Information and Communications Technology (ICT) and in many cases work with mobile technologies. Overall, a major underlying driver is affordable ICT technology and the Internet which offers direct access to global markets. The growth of the gaming industry (companies such as Supercell and Rovio) has been the flagship of this trend but it is also observable in the context of more traditional industries.

In fact, it can be seen that large companies are gradually reorganizing themselves and becoming platforms for growth seeking SMEs and their own workers to innovate. The traditional product business is gradually shifting towards a more service and customer oriented direction driven especially by ICT and the ability to maintain real time connections to the products sold⁷³.

Furthermore, large companies are trying to make their organizations more adaptive by using more agile processes e.g. in software development and project management and by using “Intrapreneurs”, that is, workers who act like entrepreneurs within their organization. Large companies are also gradually embracing the so called approach of creating shared value (Porter; Kramer, 2011) and want to become platforms for society at large (Alahuhta; Kosonen, 2011).

The goal of shifting towards a more decentralized structure is also increasingly endorsed by the Finnish government that is encouraging entrepreneurship and SMEs to seek growth. It has been stated that public authorities and industrial competitiveness policy must focus on supporting the birth of such success stories. Industrial competitiveness policy must also promote the development of the capital markets and also ensure that Finland is a welcoming investment market for businesses. Overall, it is seen that global challenges offer traditional industries an opportunity for growth and renewal (MEE, 2013).

This is already partly observable in some statistics, e.g. as shown in Figure 3 where the proportional number of SMEs and micro enterprises has been showing promising growth (the economic recession is also observable in the statistics). At the same time the proportional number of large corporations has declined more drastically and the trend of job creation by smaller companies is likely to continue.

⁷² aaltoes.com, startupsauna.com and www.slush.org (accessed 10th of June, 2014).

⁷³ This is enabled by technology concepts such as the Internet of things, Industrial Internet, and Machine-to-machine communications.

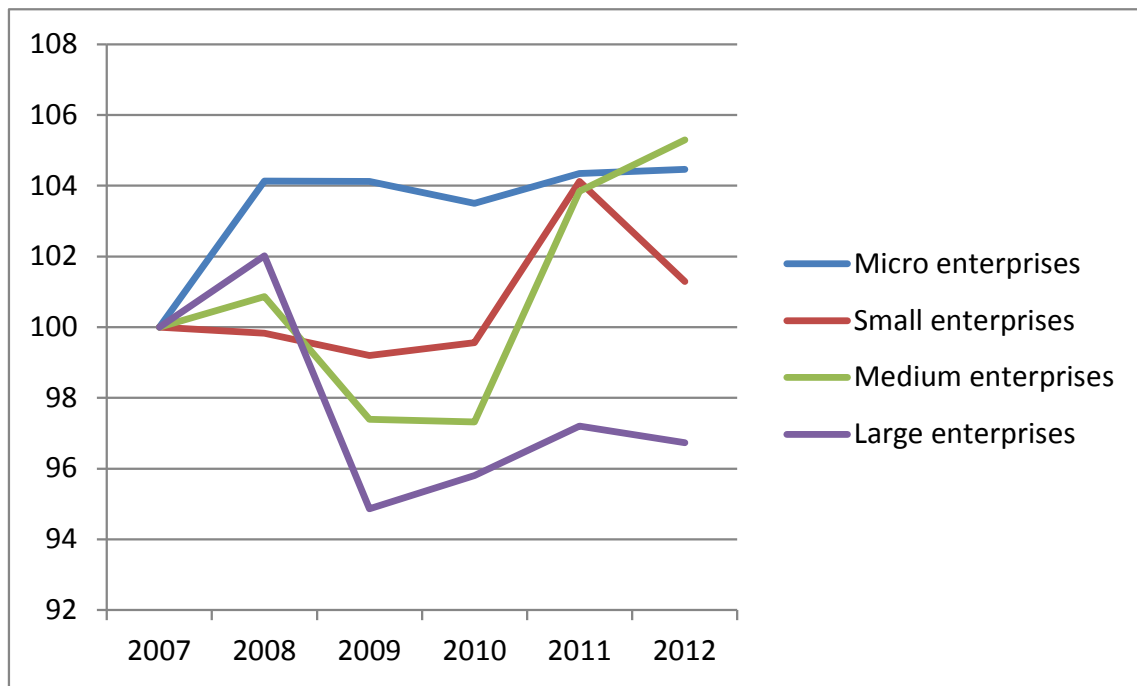


Figure 3. Number of micro, small, medium and large enterprises in Finland (2007 = 100)(source: Statistics Finland, Business Register 2012).

Thus, overall, there are many trends that could shift the Finnish export industry towards a more decentralized, effectual approach with a stronger focus on SD-logic. This would mean that the reinforcing loop ‘R Centralization of the system’ in Figure 1 would be reversed and the ball depicted in Figure 2 would reach a tipping point and, on an overall level, a path of creating value through a more decentralized and effectual approach would be taken. Therefore, in the future the Finnish export industry could be increasingly characterized by radical innovation, dominance of the effectual approach, SDL mentality, short development cycles for products and services and by innovative growth seeking entrepreneurs.

5 Discussion

Overall, we recognize that the presented hypothesis and the system dynamics model depicted above are simplifications that need further discussion and empirical analysis. However, the distinction between centralized and decentralized innovation approaches and industry structures can serve as useful basis for discussion and can be seen as reflecting, at least on an overall level, system structures e.g. in the Finnish export industry.

While the distinction between the centralized or the decentralized approaches can be a useful one, it is important to note that neither one of these approaches should be regarded as being better than the other but their usefulness depends on the context. Although recently, especially with the large scale diffusion of the Internet, the trend is towards more decentralized structures, the centralized approach and leveraging economies of scale is still important especially for large corporations in infrastructure industries that need centralized expert based planning and hierarchical structures to organize large workforces. However, we would also like to point out that decentralized innovation processes can be beneficial and complementary for capital intensive industries as well because of the transformative role of ICT in every industry. For example, in the future so called “smart city” solutions require that many traditional industries such as construction and energy are integrated with ICT and more decentralized processes. More complexity in the operating environment and within industries also calls for new approaches.

While we also recognize that the proposition brought forth here, that GDL corresponds more to centralized and SDL more to decentralized structures, needs more discussion, this same principle could apply to the GDL versus SDL distinction. It can be argued that the Goods-Dominant logic is still a useful point of view especially for infrastructure driven companies. Still, it is often the case that GDL dominates where a more decentralized SDL oriented approach would be much more useful.

Furthermore, the model presented here could be expanded to having multiple layers in a similar manner as Murmann and Frenken (2006) have expanded the cycle of technological change (Anderson; Tushman, 1990) to a layered hierarchy of technology cycles. Some parts of the overall system are likely to follow a more centralized approach and can serve as platforms for smaller actors to innovate as suggested in platform literature (Iansiti; Levien, 2004; Eisenmann et al., 2006; Gawer; Cusumano, 2008).

In addition to expanding the analysis to multiple layers, future work could also be focused on empirical analysis. Comparisons could also be made to other countries such as the U.S. whose market structure can be seen as being more decentralized (e.g. in terms of job markets and entrepreneur culture) or Germany where the large number of so called

Mittelstand companies (i.e. companies that are in the upper ranges of the SME category) played an important role in economic growth.

6 Summary

In this paper we compared centralized and decentralized innovation approaches and industry structures. We elaborated this comparison by drawing basis from related literature and used qualitative level system dynamics to showcase the potential path dependency on both approaches.

Furthermore, we hypothesized that, on an overall level, Finnish export industry is currently locked in a self-reinforcing cycle of a centralized approach where large corporations focus on building and exporting large investment goods with long investment and development cycles. In addition to this the paper discussed different trends that could reverse this cycle and shift the industry towards a more decentralized path. Such trends are e.g. the increasing number of growth seeking SMEs in Finland, an emerging vibrant start-up scene and the trend of large companies reorganizing themselves and increasingly becoming platforms.

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Managerial Innovations in Healthcare

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Due to the current economical recession and the aging population, public healthcare is in a financial crisis. So far, there has been little competition or customer orientation in public health services and it has not even been possible to measure its productivity. Nevertheless, there are growing pressures to increase competition, customer orientation and productivity in healthcare. We are studying the role of managerial and service innovations, assisted by the use of Internet and social media, in implementing this change. We have conducted a series of interviews at a specialized healthcare clinic, where significant increases in productivity and quality have been achieved through managerial innovations.

1 Introduction

Substantial literature indicates that service industries, and especially governmental services, lack the capability to perform as efficiently as manufacturing industries. Manufacturing companies are squeezed by market-driven performance and quality comparison that reallocates resources from inefficient to more efficient and innovative firms (Dunleavy and Carrera, 2013) while governmental services usually lack this mechanism. Combined with the immortality of public organizations, this leads into stagnation. Performance measurements in the public sector are still at their early stages, although some academics have already measured the productivity of governmental services (Jones and Thompson, 2007).

However, the ongoing recession urges the implementation of efficient methods that can provide information about performance and quality, fueling innovation in public organizations without research and development departments of their own. We need more knowledge of how performance indicators and managerial innovations affect the healthcare system and its performance.

1.1 Paradigm Shift in Healthcare

Healthcare has traditionally been very hierarchical and provider-centric with minimal customer orientation or right for the customer to choose. The recent EU directive (2011/24/EU) on the application of patients' rights in cross-border healthcare, effective as of late 2013, is targeted to advance structural changes and resource reallocation. Increasing competition in Europe will give local healthcare organizations incentives to pay attention to performance, ratings, quality, and customer needs. The emerging market-orientation can promote withdrawal from the path-dependency that sets invisible limitations to organizations' choices. This path-dependency is grounded not only in artifacts, such as operational models, routines, and processes, but also in a socially constructed conception of an organization's limitations and possibilities.

National interpretations of the implementation of the directive vary: the implementation can either spark dynamics and innovations or help protect the old national model of healthcare service production which can be detrimental to the development of quality and performance. The new market-oriented situation challenges healthcare service providers' renewal capacity forcing organizations to seek for innovative ways to reallocate the limited resources in order to maximize their health-related outcomes in the national framework.

We argue that healthcare providers' efficiency and innovative capacity correlates with the shift in the legitimacy base demanding operational transparency and information systems' capability to capitalize on decentralized information and embed it in the customer processes (Teece, 2009).

This study points out some policy and managerial implications of the enlargement of the resource-based view on and customer co-creation in the innovative process within healthcare and addresses managerial innovations in healthcare in the theoretical framework of Resource-Based View and Service-Dominant Logic (Vargo and Lusch, 2004). We highlight the issue by both viewing the process and implications of managerial innovations and utilizing the implantation of social media in the healthcare context.

1.2 Managerial Practices and Organization's Performance

Throughout the 19th and 20th centuries, the productivity of manufacturing has on the average increased by over three per cent (3%) per annum while the productivity of service production has increased by only one per cent (1%) per annum (Kauhanen et al. 2014). In manufacturing competition and structural changes have been significant sources of growth of productivity whereas even in private services structural change (paradoxically) can result in the exit of the more efficient organizations.

One explanation to this paradox can be that personnel resources shift from the exiting companies to new but less effective ones (Kauhanen, 2014). In the public sector, organizations reach after a couple of operational years almost immortality. Originally Kaufman (1976) used the term to refer to the extraordinary nature of the public sector. This

static nature emerges when a conflict between an organization's *modus operandi* and the wider environment's normative, regulative or cognitive legitimacy breaks, forcing political powers to dictate a new order (Dunleavy and Carrera, 2013).

In an extensive study on management practices, Bloom et al. (2011) compare management practices in 20 countries indicating how well the fast implementation of new managerial practices correlates with increases in efficiency and performance. The fast innovation implementation generates competitive advantage. Bloom et al. (2011) indicate that companies adopting critical management practices concerning "monitoring, targets and incentives" not only are the performers in terms of profitability and growth but they also survive longer. In general, governmental and founder-owned companies appear to be poorly managed. Authors relate market competition with management practices, thus, the tougher competition the better the management practices. Research on U.S. hospitals indicates good management practices whereas in schools the managerial practices are poor (Bloom et. al. 2011).

1.3 Customer in Healthcare

The term *patient* originates from Latin and old French, positioning a sick person's role to "*enduring without complaint*" (<http://www.etymonline.com>) whereas the role of a user or customer emphasizes activity. In order for the customers to play an active role in Patient-Centric Medicine (PCM) they need access to information enabling them to compare the quality of various health services.

This calls for more transparency and easy public access to both objective and subjective information. Objective information includes things such as success and mortality rates of various operations and cures while subjective information is based on the feedback collected from prior customers. This will give the customers a factual basis on which they can make enlightened choices about their healthcare providers.

Existing literature views low productivity, non-existent or minor inclination on customers' needs, and poor management practices in the absence of competition as attributes of governmental services (Bloom et al. 2011; Dunleavy and Carrera, 2013).

1.4 Social Media in Healthcare

Research on U.S hospitals show activity and interest in the deployment of social media tools in healthcare processes, following the implementation pattern of other managerial innovations (Belt et al. 2012). A study on U.S. healthcare providers' social media use points out how organizations link their social media utilization to their strategic goals, such as marketing unique quality (Revere, et al. 2010), which is nonetheless challenged on social media rating sites.

Research on social media suggests that online rating sites on social media can improve healthcare quality. Verhoef et al. (2014) reviewed 21 articles concerning healthcare ratings on social media. The authors suggest that online ratings have a positive impact on quality but also a bias arising from the small samples and the anonymous nature of sites which cannot be eliminated (Verhoef et al. 2014).

However, according to Kaplan and Haenlein, the credibility of information can be improved. The authors claim that the effective exploitation of the knowledge of the crowd needs to fulfill three criteria: firstly, the audience interested in a topic has to be large enough, secondly, it has to represent divergent stakeholders, and thirdly, actors have to produce the substance autonomously (Kaplan and Haenlein, 2014).

Several studies suggest that the introduction of social media can provide efficient means for collecting and sharing comparative information concerning service producers' quality and performance that may power organizational development (Verhoef et al. 2014, Greaves and Millet, 2012; Emmert et al. 2013). Social media is one step forward towards ubiquitous healthcare which will provide individuals with health-related applications that e.g. generate information on the user's acute state in chronic illness situations and give alerts of pandemics.

Academic discussion on social media in the healthcare context is scanty. However, e.g. Van de Belt et al. (2012) show that although social media is in use in almost every West European hospital, the ability to capitalize its full potential still is scarce. The authors mention two exceptions: the Netherlands and the United Kingdom which are able to follow the U.S. example (Van de Belt et al. 2012). The gap between trustworthy information offerings and user demand creates a need for more academic understanding of how healthcare service providers perceive the utilization of social media tools in co-creation.

However, the majority of academic literature concerning healthcare-related innovations ignores social media's capacity to empower stakeholders although healthcare service users show increasing activity in the Internet seeking for health-related information

1.5 Service Innovation

The era of Patient-Centric Medicine (PCM) calls for the adaptation of market-oriented techniques in order to understand customers' needs and generate new service offerings. The perception of service innovations is more challenging than in manufacturing but Gallouj and Weinstein (1997) provide a useful basis for viewing service innovation as modification of present service offerings. The modification can include any change that adds, associates, dissociates or subtracts something to, with or from the original service (Gallouj and Savona, 2011). Michel et al. (2008) offer a more customer-

oriented definition viewing service innovation as a change in customer involvement and the way they operate in the value-creation process.

Including customers in the innovation process may generate benefits to all potential stakeholder groups. Sundbo and Toivonen base on Service-Dominant Logic (SDL) which emphasizes the intertwined nature of the service provider and the object actor in service value creation (Vargo and Lusch, 2004a, 2008, 2011).

The recent model of user-based service innovation advocates the active role of customers in the service innovation process, bringing forward the potential of social media in the innovation process (Sundbo and Toivonen, 2011). The authors elaborate on the academic marketing management approach introduced by Vargo and Lusch (2004a, 2008, 2009, 2011) who argue for the primary nature of services. In new offerings generation process comes up *co-creation* (Lusch et al., 2007), the term refers to co-operative action with customers and enlarging resource-base over organizational borders.

Value is always focal and inseparable from both the user and the context (Vargo and Lusch, 2004a). Value will be materialized only if a customer unifies the service providers' offerings with their other resources in the certain context (Vargo et al. 2009).

In order to improve quality and speed up the development, traditional techniques, such as surveys, panels and focus groups, are insufficient, especially if service providers are looking for a competitive edge. Organizations pursuing competitive advantages and radical (as opposed to incremental) development need to map out service users' latent needs and capitalize on the wisdom of the crowd (Kaplan and Haenlein, 2014).

Latent needs refer here to wishes and needs that the majority of customers or service users are unable to voice or even to imagine. However, involving lead users (von Hippel, 2005) in the service or product innovation process can benefit all the users, potential users and other stakeholders.

The Internet provides a faster and more cost-effective means to collect feedback, interact, and to co-operate with customers than more traditional tools, such as panels, focus groups and surveys. Social media, such as Facebook, Twitter, You Tube and blogs, has its limitations but nonetheless offers an interactive, participatory and dynamic arena for organizations compares with traditional more static and one-way communication methods. Also the potential of the traditional methods to generate new ideas that can lead into innovations is very restricted. Healthcare providers have still quite limited capability to utilize the power of social media although their customers are already there. As many as 80% of the Internet users seek for health-related information on the Internet (Emmert et al. 2013; Lin and Umoh, 2002; Ardito, 2013).

Fast moving market-oriented companies have already started to utilize the scattered knowledge of decentralized interest groups attempting to address common interests. Kaplan and Haenlein (2014) compare the use of Internet-based social media tools (Wikipedia) to the proliferation of the printing press that democratized the world of knowledge starting in 1439.

Social media driven co-operative projects, underpinned by social media applications, have altered the power positions between product or service producers and consumers. Authors define the co-operative projects as "a special form of social media application that enables the joint and simultaneous creation of knowledge-related content by many end-users" (Kaplan and Haenlein, 2014).

Some pioneering companies, such as iStockphoto and Threadless.com, have expanded their resource-base over company borders to utilize the wisdom of the unlimited audience by adopting the co-creation approach and *crowdsourcing*. An open call to co-create involves customers, potential customers, partners and other interest-groups willing to put effort into it. The term crowdsourcing reflects an attempt to harness the know-how and innovativeness of a large group, consisting of an unlimited number of ordinary people, to carry out a specialized task (Howe, 2006).

The concept of crowdsourcing materializes the theoretical approach of Service-Dominant Logic (S-D L), offered by Vargo and Lusch (2004a, 2008, 2009, 2011), and the Resource-Based View (Penrose, 1959, Barney, 1986). According to Penrose's original definition "it is never resources themselves that are inputs to the production but only the services they can render" (1959), whereas Barney (1986) emphasis the goal-oriented aspect of an organization, pointing out that resources "must enable a firm to do things and behave in ways that lead to high sales, low costs, high margins, or in other ways add financial value to the firm".

A more recent view on resources emphasizes dynamic capabilities that refer to organization's velocity, innovativeness, flexibility, knowing, and quality (Teece, 2009). Teece et al. define dynamic capabilities as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments. Dynamic capabilities thus reflect an organization's ability to achieve new and innovative forms of competitive advantage given path dependencies and market position." However, the Internet-based vehicles provide an opportunity to elaborate the basic assumption of firm resources, viewing resources as immobile and company-specific.

This study addresses the issue of managerial innovations in the theoretical framework of Resource-Based View and Service-Dominant Logic in the healthcare context.

2 The Theoretical Framework

In this chapter we shall view the performance gap between service industries and a manufacturing. Then we discuss what crucial factors in service industries in general, and especially in public healthcare context, can explain the differences.

2.1 Study Design

This exploratory study aims to deepen the understanding on service innovation in a public value network by viewing managerial practices in public healthcare sector (Sutton and Staw, 1995). In the public healthcare sector services are generated in a systemic way in an ecosystem comprising various actors. This study aims to shed light on value generation process in the value network.

This multiple mixed methods case study utilizes multiple data and includes archive materials, other documents, observations and interviews of public sector staff. The data was collected during a period of six months in 2014.

Data collection has been carried out in a unit of specialized healthcare. The focal unit consists of five clinics with specialized emphasis. The focal clinic co-operates locally with other municipal service providers. Our data comprises interviews with actors embodying different angles and expertise in service process both from professional point of view and local position.

Nine out of ten of the interviewees represented employees with managerial status. The running time of the interviews varied from 1.5 to 4 hours, two interviewees were interviewed twice, and one interviewee was interviewed three times. On the average, an interview lasted for 2 hours. The study questions were based on standardized questionnaires. Moreover, the data includes statistics, such as key performance indicators concerning referrals, queuing times and costs.

We used purposive sampling along data collection process in order to gain an inclusive understanding of the resource-base, co-creation and customer-orientation among the healthcare personnel and especially the managers' means to carry out changes. We have analyzed the interviews using the Atlas.ti software trying to identify themes, patterns, connections and underlying properties (MacInnis, 2011).

2.2 Efficacy Gains by Managerial Innovations

The evidence shows a phenomenal improvement in the focal clinic's efficacy and effectiveness after mobilization of managerial innovations, such as performance indicators and Lean. However, the impetus for the deployment of new managerial practices came from the outside. The organization were confronted a public critique due to the long queuing times.

This forced the management to review the treatment processes, practices and costs. A change program was launched in 2008. Managerial innovations brought the most remarkable productivity improvement by a) the reorganization of a queuing management, b) the introduction of a new appointment system, and c) distillation of the care process. The customers' commitment to the treatment enhanced the performance by reducing "no show" bookings. A considerable change that improved customer commitment included three items: a) the introduction of a treatment plan that enabled customers to preview the whole treatment process, b) fast seizing on symptoms instead of an examination-centric operation model, and c) restricting the treatment to 3 or 4 appointments in comparison to a continuous therapeutic relationship usually lasting several years. Several respondents in managerial position reported that the majority of customers actually benefit more from these shorter interventions that come in time.

The clinic was able to achieve significant time gains by standardization of reporting. Time consuming reporting style induced a remarkable performance gap and individual styles varied. The standardization enabled staff to receive more customers than previously.

To conclude, the most remarkable result of the changes was that in 2007, a clear minority of customers (18%) got into ward care in less than three months, compared with the vast majority of 98% in 2010.

The process innovations improved operational transparency and collegial surveillance. The transparency improvement was achieved through the implementation of an electronic calendar.

The other actors in the value network were just entering into the phase of experimentation of managerial innovations. Due to the experimentation phase, the respondents were unable to report any numeric changes. However, they did report a frustration caused by the reluctance of the staff to adapt themselves to unfamiliar concepts in this context, such as leadership, an electronic calendar application, and performance indicators.

2.3 Internet-Based Tools

The data suggests that the deployment of Internet-based tools and social media is restricted. The majority of informants expressed uncertainty about the organization's presence in social media and company policy concerning the use of social media and poor or non-existent personal knowledge of the use of social media. However, the informants brought forward customers' explicit expectations for both Internet-based media and easier and more flexible interaction, for instance the possibility to make and cancel appointments electronically. According to the respondents, the defective privacy protection of e-mail precludes its use.

3 Conclusions

The studied organization indicates that also public healthcare can break out from the path-dependent way of the inspection of *modus operandi* and improve performance by managerial innovations. Public healthcare can reach significant performance gains but this requires utilization of users' knowledge and user-engagement in order to

guarantee the involvement of all the relevant views. The limited utilization of the information and communication technology in communication with customers refers more to Weberian type of bureaucracy than the value co-creator.

The recent EU directive is one indicator of the rapid changes in the operational environment that force healthcare organizations to innovate. However, this calls for refraining from national protectionism and allowing resources to gravitate from poorly performing units to better performing organizations, even across national borders. The organizations have to focus on performance indicators, transparency, and production of comparative information that enables customers to make enlightened choices.

The immortal nature of public organizations prohibits the natural exit of unproductive service units and emergence of more efficient and effective ones. Administrative structures should not be a goal in themselves, but an enabler of services where they are needed, thus the mobilization of comparative information, and transparency should be advocated. The recent EU directive provides a good base for this-

We have just seen the first phase of the ICT-driven revolution in the healthcare context. Mobile solutions, based on smartphones and such, can provide assistance and information concerning health issues, fitness, and lifestyle coaching and management. New applications can also be used to assist in chronic disease management. Ubiquitous healthcare refers to the emerging area of health-related technology. It utilizes e.g. a large number of patient sensors and actuators to monitor customer's both physical and mental state.

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Culture and Entrepreneurial Attitude and the Innovation Dimension in Brazilian Companies.

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This paper describes the relationship between cultural variables, the individualism/collectivism and verticalism/horizontalism dimensions, and with entrepreneurial approach, through the innovation dimension, in 33 small, medium and large Brazilian companies. The sample consisted of 450 owner-managers and employees of the 33 companies, divided into 29 activity areas. An instrument of Cultural Values was adopted; the relationship between Culture Entrepreneurial Attitude was tested within the Innovation dimension; analysing models taken from mediation and moderation tests did standard and hierarchical regressions. The Horizontal Collectivism cultural manifestation strength was significant to directly predict the entrepreneurial attitude; the individuals perceive the group as the source of their identity, and develop little confidence in their authority.

Keywords: Culture, Entrepreneurial Attitude, Innovation.

Introduction

The adoption of “national culture” as the subject that resulted in and led this study has allowed a more clear analysis of certain characteristics of the entrepreneurial profile. Or has it? This paper is a result of studies that sought to identify the perception of classical and contemporary authors, as well as and the outcomes of researches on entrepreneurship.

The answer to the question above seems simple; however, culture is not the only explanation of entrepreneurial attitude, which is affected by several factors, including social, psychological and economic ones. The point here is not to decide which of these factors prevails, but to identify, from a sample of entrepreneurs in the city of Brasilia, DF, the relationship between the tendency to certain cultural patterns and entrepreneurial attitude.

Therefore, this article aims to study the entrepreneurial attitude variable through culture, or, based on Hofstede's model, by introducing the results of a research conducted by Souza-Depieri (2005).

This article does not intend to introduce original information, but aims to provide a different perspective on culture and entrepreneurial attitude.

Culture

The idea of culture in ancient Rome was associated to Nature. For the religious men, it concerned the care with the gods; and the Greeks interpreted it as the formation of the body and spirit of a society. In essence, culture represented the relationship among human beings within an organized society. The term culture in its different approaches is considered a produced capital in a given field. Such concept was defined by Bourdieu (1989) as a network or configuration of relationships that depend on the position of the social agents in the social space. From an anthropological approach, culture is normally introduced as a way of doing, feeling and thinking inherent to a given human collectivity. In common sense, culture is one's scientific, artistic and literary knowledge; from a society point of view, culture refers to the capital of intellectual and artistic works (Bonnewitz, 1988). In this case, to distinguish culture as understood by the intellectual elite, mass culture is defined as a group of knowledge and values conveyed by the media and other cultural organizations. From a sociological view, culture is a set of values, norms and practices acquired and distributed by a group of people, encompassing different conceptions (Bonnewitz, 1988). The cultural field consists of symbolic codes, organized in different cultural systems. Thus, according to Bourdieu (1988), culture is a set of perception schemes developed or made by groups of people with legitimate authority.

Souza-Depieri and Souza (2005) have introduced a conceptual overview of culture. They understand it, from a philosophical view, as a system of ideas, techniques and artifacts, behavioral patterns and attitudes that characterize a society; and, from an anthropological view, as concept that depend on learning, as behaviors tend to project the learning perceptions. The anthropological perspective also sees culture as a style, a way of doing things (Da Matta, 1984, 17). Da Matta (1984, 17) states that people acknowledge as important the laws for "family, marriage, sexuality, money, political power, religion, morality, art, food and pleasure in general". Such choices follow an order, which reinforces the idea that the relevance system and limit of a given culture can only be assessed if compared to other cultures.

Studies on culture have shown that human groupings think, feel and act differently. As a result, any analysis on human behavior must consider certain cultural differences. These differences are expressed in different ways, such as by values that Tamayo (1996, 178) defines as "principles and goals that guide one's behavior", or "shared beliefs, symbols and rituals that constitute the cultural elements of a society or enterprise, which, in most cases, are unconsciously incorporated". By applying this definition to organizations, it is convenient to conclude that the values have a direct relationship with the way people perceive their environment. Such values then becomes a mental model

and can be perceived in the everyday speech of the company's employees, not necessarily equally, but depending on factors such as their job position, gender, company sector and the length of service.

Weber (1982) suggests that the main aspect of contemporary culture establishes a kind of influential society, with a rational way of life design. Moreover, one's participation in a group involves patterns of behavior, ideas and ideals. As a result, the culture of a people might be viewed as the result of the power of a group, and of the conflicts in their historical evolution.

Culture, therefore, according to Weber (2000, 246), is an evaluative concept; and values "are not exhausted in valuations, or in the objects with which they are connected". Schwartz's thought (1987) on social values as based on one's basic needs to understand a society and its dynamics must be highlighted here as a necessary tool to understand the relationships between the values of a society and its prevailing ideas.

The study of culture shows that human groups think, feel and act differently. Such cultural differences express themselves in different ways, and represent different expression levels of a culture. These levels are: symbols, which, although visible, convey specific meanings to those who share a given culture - words, outfit, gestures, pictures, flags - their heroes - alive, and deceased, real or imaginary people who represent role models, since they have characteristics there are quite esteemed in a given culture - rituals - collective activities that, although superficial, are considered essential to achieve certain purposes, from simple greetings to ceremonies; and values, the deepest level of all - the tendency to prefer a certain state of affairs from another, or a guided feeling, with a positive and a negative side (Hofstede 1997, 23). The first three levels were grouped by the author of this study and labeled as practices, as they are visible to an outside observer.

Hofstede (1997) shows that culture comes from the social environment; therefore, it is acquired, not inherited. This explains three levels: human nature, or what all human beings have in common - genetically determined, perceived through the human ability to feel fear, anger, love, joy, sorrow, the need to connect with others, to play, to exercise; and the ability to observe the environment and talk about it with other human beings; culture, which establishes how the human nature is expressed; and personality, a unique mental programming that cannot be shared with any other individual, as it encompass a person's genetic heritage, personal experiences and cultural influences (Figure 1).

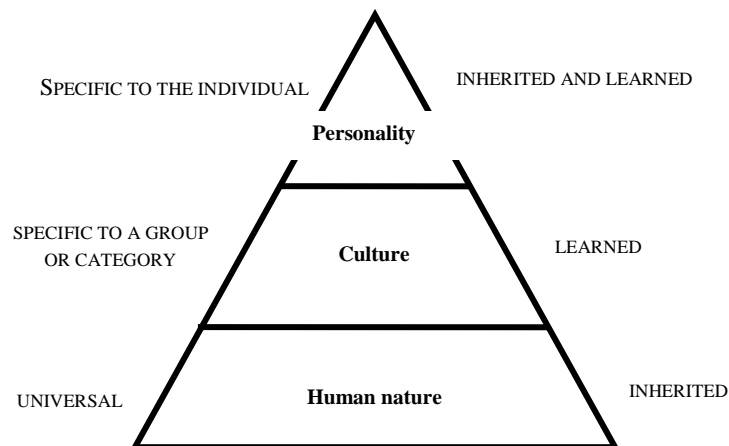


Figure 1. Mental programming levels.
Source: Hofstede (1997, 20).

Hofstede (1991, 210) defines culture as "the collective programming of the mind that distinguishes members of one organization from another". It starts in the environment "in which the child grows up" and follows the individual throughout his or her life. In this scenario, working environment is an extension of "school and family life". Thus, since their birth, men have their behavior and experiences defined by customs, language, their behavior at work, and actions as products of their culture.

In this article, the concept adopted is culture because of a mental programming resulting from a continuous learning process "acquired during childhood, when we are most susceptible to learning and assimilating". In this context, the word programming indicates "the most likely, comprehensive responses to each person's past" (Hofstede, 1997). Thus, culture includes all unique actions, activities and interests of a society, conditioned to historical moments, with specific rules and unique reasoning, all which shaping human beings for their purposes.

The organizational environment, in turn, shows several ways of thinking culture, a collective phenomenon shared by people of the same group, and of analyzing it culture within its very context, as the managers' behavior, a result of their relationships established throughout life, "reinforces the prevailing patterns of thought, feeling and actions in all spheres" (Hofstede 1997, 272). The involvement of workplace collective behavior in this analysis is important to understand the relationships among the workers within an environment, and the relationships between them and the internal and external context of the organizations - social systems -, making clear that culture is part of that system and might be considered as organizational culture.

Organizational culture is a dynamic, socially created concept, associated to the space and time dimensions. It involves the relationship between an organization with its environment, its organizational actors, and the benefits that are implemented from the outside and within. From this perspective, culture is considered by Schein (1989, 86) as:

A set of basic assumptions that a group has invented, discovered or developed by learning how to deal with external adaptation and internal integration issues, and that worked well enough to be validated, and taught to new members as the appropriate way to perceive, think and feel regarding these concepts.

On the other hand, the organizational phenomena cannot be analyzed independently, but rather in interaction with values, habits and social ideologies. Thus, it is convenient to associate this study to the local culture - the Brazilian culture, in this case - as a means to determine the cultural trends in which organizations look for their identity, par excellence, and eventually align their inherited characteristics and culture with the changes and transformations in the world today.

Following this line of thought, due to the rules in the productivity game developed in the dynamics of contemporary capitalism, which result to the management foundations and criteria, the organizations ask:

the administrator to turn into a hero, a creator of myths and values, a catalyst for the outbreak of symbols around which crowds of enthusiastic workers are gathered to achieve sustainable productivity and performance (Aktouf 1996, 216).

This leads to some questions, such as: how does the entrepreneur, the manager or the employee, in general, face the organizational culture and its demands? What are the dimensions of the actors' profile, who need to face the organizational culture mixed with management elements such as quality, ethics, ecology, social responsibility and, above all, "propositions for management methods towards cohesion, complicity, the spirit of initiative and creativity at all levels" (Aktouf 1996, 216)?

Then, seeing as crucial the understanding of cultural dimensions expressions, adopted by many authors of the organizational culture, help understand the context experienced by individuals and lead to an increase in researches on culture. The next subsection introduces some significant models that represent an individual or a group within the culture of an organization.

The model developed by Hofstede is now explained for a better understanding of organizational environment and the roles of its actors.

Geert Hofstede's Theoretical Model:

Some studies by Hofstede (1984) that explain culture from the perspective of a person's social environment - whose groups' cultural differences are expressed in different representations - contribute to understand the concept of organizational culture. They help us find the cultural dimensions that identify the relationships among the groups within an organization and show the importance of a national culture as a reflection of the different attitudes and values of the groups' behavior. According to Torres (1999), from then on, culture could be adopted as a causal (necessary and sufficient) predictor variable (necessary but not sufficient), in the extent that a person's intentions and behaviors could be directly related to the cultural group which he or she belongs.

The four dimensions introduced by Hofstede were the basis for characterizing and differentiating culture in the countries that he studied: power distance; individualism or collectivism; masculinity, and uncertainty avoidance. These dimensions are related to the deepest level of cultural expression (values), and respond in accordance with the group's mindset. In Porto's point of view (2004), they define a certain behavior that, when socially accepted, is supported by the group.

The Power Distance dimension is the degree of acceptance from those who have less power within an institution or organization of a country, an unequal distribution of power. It is the measure of a hierarchical distance based on the value systems of those who have less power. The individualism and collectivism dimension is associated to the different ways of self-perception, and one's relationship with the group. It is the reason why individualistic and collectivist societies deal with the role of the individual in different ways. Masculinity and Femininity is the dimension related to the influence of gender differences in determining the social roles, which are culturally determined. The males' behavior is typically associated with strength, firmness, ambition, assertiveness, self-confidence, competitiveness and the pursuit of success and the material progress. The females' role, in turn, focuses on taking care of the household, children and the others in general. The author explains that, in this context, the terms male and female were adopted to refer to gender, that is, men and women have a greater or lesser degree of cultural values associated with both genders. The Uncertainty Avoidance dimension is associated with the degree of anxiety of individuals of a certain group in any unknown or uncertain situation, expressed by stress and a need for predictability, among other aspects, which calls for written or unwritten rules.

A field research was conducted with small, medium and large Brazilian companies, and the results were presented in this article. it aimed to identify differences in cultural patterns and subsequently determine the possible entrepreneurial attitude-oriented relationships among the owners, managers and employees of a company in its different levels. In order to build a context for this study, some cultural traits of the Brazilian culture are described below.

The Brazilian Culture

The uniqueness and originality of every civilization is "performed by the individuals who constituted it". In this line of thought on this, Weber (2000, 246) tries to explain modernity based on the ascetic Protestant values that forged the attitudes towards labor, leading to the accumulation of capital, which, according to Weber, boosted contemporary capitalism and the modern life. Although Weber considers the more complex sociocultural phenomena, he believed that rationality triggered other life values as the following dimensions: economic, social, political, aesthetic and cultural (Weber, 2000, 246).

Human beings, individually or collectively speaking, use their experience, among other things, to build their social identity. Certain geographic and climatic features of Brazil - as well as other characteristics that, added to experiences and economic, political and social factors, are developed in the Brazilians' social life process - build an identity that characterize the Brazilian people. Quoting Da Matta says (1984, 16), Brazil "was discovered by the Portuguese, not the Chinese," and "we speak Portuguese, not French".

By analyzing the spirit that guided the colonization of Brazil, Holanda (1995, 243) identified a characteristic inherited from the Portuguese colonization: a great tendency for adventure, in which the employee "would have a very small role, unlike the adventurer"; and the quest for prosperity without cost, as easy wealth would be boldly chased. It is appropriate to remember that this same tendency inspired the Brazilian slavery system as a mechanism to bring opportunities and wealth to the colony. Furthermore, Holanda (1995 243) refers to a "primitive patriarchal family model" that, since ancient times, has caused a "social imbalance, the effects of which remain today". Such model was adopted in the Brazilian organizations, leading to imbalanced institutional dimensions.

Freyre (1981), referring to the size of the master's house as "great house" (casa grande), considered the core of Brazil's agrarian system, implemented by the Portuguese colonization - the patriarchal family, in which the patriarch has absolute power and controls the network of favors and interests, establishing an aristocratic power -, the representative of a social minority. Freyre (1981) analyzes this master-slave relationship, as well as a patriarchal style that values the personal and friendship ties, which still exist within the Brazilian families and organizations. Although today this influence is outdated and has been modified by technology changes, from the capitalist view, the relationships within national and global markets call for a new social and economic order.

Freyre (1981) states that the master's house shares a connection with the slave quarters; Da Matta (1997) links the house to the outdoors, often treating society as a big family, which is also extended to the organizations. People's behavior differs in these spaces, outdoors and, consequently, in public spaces. A house "filled with values and multiple realities" is a moral and social place, filled with relationships defined in the social dimensions, with a predominantly conservative speech and a space marked by personal recognition.

The outdoors, according to Da Matta (1997), is a locus of battle, of disorganized groups, with no commitment to respect or friendship; it is a dangerous, insecure place. Da Matta (1997) also states that home is not considered a workplace, as the household is not seen as such. Indeed, hard work is meant to the streets, which, as the author says, in "the Roman Catholic tradition", is punishment.

The confusion between these spaces has been transferred to the organizations today, which hold family relationships that confuse "intimate and kind moral relationships with a purely economic relationship. That often results a group of dramatic situations associated with this type of work relationship, in which the economic dimension is subject to, embedded in, the political and moral dimensions" (Da Matta, 1984, 32).

In such dynamics, public and private are mixed; the State is often a fragile factor in such diffuse presence of the institutions and social relations between social classes and groups. The results are irregular, erratic social, economic, political and administrative lives. Industrialization and urbanization have not affected the great significance that family life has always had in Brazil. Indeed, they have increased the significance of individual achievement along with the importance of the family in the core of the companies/organizations.

In patrimonial societies, personal relationships and influence networks are typically used to get a job, to have a project approved, to close a deal with the government. Such characteristic of the Brazilian culture might be praised as a creative feature; on the other hand, it might be negative, since it means bending rules, being favored - the infamous "Brazilian way", a mechanism adopted to establish, maintain and regulate personal or organizational relations. The Brazilian way, according to Da Matta (1984, 98), is a way to harmonize certain "legal rules" that often does not correspond to the demands and relationships of the Brazilian society. The application of such laws, par excellence, is subjected to influence affairs for personal purposes.

Rationality lies "in a clear, sane distinction between desires, personal interests and the actual world", and is expressed in "a demystification of what is real, in refusing simplistic representations of what the world means, which needs to be understood through the institutionalization of organizations on a rational basis" (Coelho, Bandeira, Menezes, 2000, 29).

All considered, it is understood that organizations are organized according to the culture of their members; to identify the dynamic relationships between their groups, which affect directly their members' attitudes, is to understand a company's dynamics and demands that ensure its sustainability or economic survival. Thus, the next section analyzes a conceptual survey on entrepreneurial attitude that aims to identify the relationship between the actions of the group members and the experienced culture.

Entrepreneurial Attitude

To understand the entrepreneurship phenomenon is to research one's relationship with an action. In order to explain the difference between that phenomenon and attitude, it is crucial to explain the various confusing concepts cited by some authors. The entrepreneur is seen as "innovation-oriented, who focuses on the production of changes" (Cruz, 2005, 38). Several authors, according to Cruz' conceptual survey (2005), label such entrepreneur as a "booster" of the social economic development, because "they are the ones who apply new patterns of behavior, and who change values and behaviors based on their creative attitude - the entrepreneurial vision". The entrepreneur, therefore, is an agent of change.

To better understand the line of research adopted in this study, it is necessary to introduce two concepts that often lead to misunderstandings and misinterpretations in the literature. The first concept is behavior, which may be internal to the individual (dispositional) - humor, skills or desire; or external (situational) - the characteristics of a task, social status or physical environment. The second concept is attitude. For Torres and Nebra (2005), attitudes are "relatively stable evaluative responses to a certain entity or situation". The attitudes are perceived according to three components: affective (or evaluative) component, which reflects whether a person likes or dislikes the entity or situation; the cognitive component, which consists of beliefs that person has towards the entity or situation; and the behavioral component, which are the behavioral tendencies towards the entity or situation. According to the authors, "although these components are intertwined, some inconsistencies among them might occur". The affective component is highlighted by Ajzen and Fishbein (2000, 3), as they show how one's mood and emotions affect their attitudes. They note state that "the fear of flying may well predict a negative attitude towards an aircraft, regardless of any other factors that might influence such attitude".

Attitudes, in Rodrigues' view (1972), are the foundation of social situations, such as friendship and conflicts as, by learning the attitudes of certain actors, one could make assumptions of their behavior. For Ajzen and Fishbein (2000, 3), the classical view suggests that social attitudes are assumed as residues of past experiences that would work guide future behaviors. However, after empirical research, these authors recognized that attitudes are considered a measurement tool for positive or negative personal evaluation towards an attitudinal object. They might be adopted to assess an object, concept or behavior in a range of dimensions, such as for or against, good or bad, and like or dislike.

On the other hand, the concept of attitude includes two major components: assessment and belief (Allen, 2000, 6). Assessment is predisposition to respond, favorably or not, to an attitudinal object. These predispositions are acquired through experience, direct or indirect, in which the object would incorporate or reject certain meanings. A few beliefs influence the attitude at a given moment; they are a significant part of one's personal attitude, and shaped by a range of cognitive and motivational processes, which may be based on selective or invalid information, and sometimes do not fit reality.

Much of the scholars' attention towards attitude comes from the attempts to predict social behavior from the study of attitudes. Attitudes, as defined as a disposition to respond, negatively or positively, to a psychological object, are expected to predict and explain human behavior. Positive attitudes should trigger approximation; negative attitudes, in turn, should trigger avoidance.

Rodrigues (1972, 402) shows a clear difference between behavior and attitude when he states that attitudes "involve what people think, feel, and how they would behave towards an attitudinal object". Behavior, in turn, is not only determined by what people desire, but also "by what they think they should do (social norms), by what they usually do (habit) and by the expected consequences of their behavior". Ajzen (1991, 180) concludes that behavior is affected by several other unique factors in a particular scenario, situation and action.

Rodrigues (1972, 401) highlights the ambience factor, as "social attitudes cause a state of predisposition to action that, when combined with a specific triggering situation, results in behavior".

It is worth noting that this research aims to contribute to a conceptual framework on entrepreneurial attitude and its relationship to culture, focusing on the entrepreneur in the Brazilian organizations. Therefore, entrepreneurship shall be explained according to the concept of national culture.

Entrepreneurship and National Culture

The most common scientific approaches on entrepreneurship, according to Fillion (1991), are the economic approach, represented by thinkers such as Schumpeter (1998); and the behavioral approach, supported by thinkers such as McClelland (1972). In general, the economists tend to associate entrepreneurs to the company's innovation, profit and the business plan, while the behaviorists focus on creative factor, attitude and motivational factors.

However, the entrepreneurial attitude must be contextualized in the actions, activities and interests of a society, inherent to a cultural system of values and social norms based on their historical moment. Therefore, a conceptual survey on entrepreneurship and the entrepreneur will be introduced, focusing on the social and cultural approaches.

It is worth noting that the entrepreneurs that participated in this study belong to a hierarchical universe - the Brazilian system. They look for alternatives for survival in order to create new social spaces. Da Matta (1997) labels them "malandros" - spivs or rogues -, ranging from a witty, smart, creative, socially acknowledged person, to small-time crooks who risk their lives pulling cons, eventually becoming a criminal.

Cultural traits, added to experiences and economic, political and social factors developed throughout one's social life, build the identity that characterizes an entrepreneur - more specifically, the Brazilian entrepreneur. In the Brazilian society, technology changes, as well as the capitalist rationale and the relations within national and global markets, a new social and economic order, "did not change the role of personal relationships and influence networks to get a job, have a project approved, close a deal with the government". This reminds us of the so-called "Brazilian way", a mechanism to establish, maintain and regulate personal or organizational relationships (Souza-Depieri and Souza, 2005). This characteristic lies in the core of the Brazilian society, and might be understood by the gap between the laws, facts and practices in this society (Ramos, 1966). Barbosa (2006, 41) states that the "Brazilian way" is "a social procedure that, without any doubt, currently defines and distinguishes us". She also says that it is adopted by "all Brazilian society," is a "special manner to solve a problem or handle a difficult or forbidden situation". It is a "creative solution for all emergencies", no matter whether the solution "is final or not, optimal or temporary, legal or illegal". It is worth mentioning here Barbosa's opinion (2006, 19) that the Brazilian way is a social choice, a category "to define the style of a particular population to deal with certain problems".

According to Souza-Depieri and Souza (2005), the Brazilian way, plus the impact of public the country's economic policies - planned "within a individualistic network in the political system", connected to a bureaucracy prone to patronizing practices "found in the Brazilian families, economy, race and culture", plays a significant role in shaping the profile of the Brazilian entrepreneurs. In addition, entrepreneurship is seen as an integrated part of values, habits and social ideologies. It is developed according to the contemporary capitalism dynamics, which creates new foundations and criteria for management towards cohesion, spirit of initiative, creativity and, par excellence, innovation.

Souza (2005) assumes that some entrepreneur-related factors, though not necessarily inherent to them, may "be found in other professionals whose jobs involve creativity and high performance". Souza suggests that entrepreneurship is "dynamic, defined by time and space dimensions", and subject "to context, culture, government policies, among other social, political and economic conditions".

However, Brazil does not have a prolific culture of innovation. This condition reflects the nature of business strategies (not only new businesses!) that simply reproduce previous stories, regarding the traditional management functions such as HR, marketing, IT, finance or the infamous "Brazilian way".

From a sociological view, the Weberian conception considers entrepreneurship as a socially constructed phenomenon within a particular society; in this case, a modern capitalist society. The usual society back in the late 19th Century (in Brazil, it could be defined as a bureaucratic rationality over a rational-legal society), in which private affairs and free enterprise were crushed by a self-ruled State over the civil society; and also interpreted the opposite way, as a deceitfully protective State that disguised its State nature but was actually an instrument of the elite. It was the so-called heritage of the Iberian patrimonialism, reinforced, according to Vianna (1999, p.175), "in the early 19th Century, with the Portuguese State being transferred to the American soil". As mentioned above, Souza (2005) sees entrepreneurship as "dynamic, defined by the time and space dimensions", affected by the "context, culture, government policies, among other social, political and economic conditions", which reinforces the perception that, in Brazil, entrepreneurship acquires unique characteristics, based on the Brazilian society and capitalist model.

The Weberian concept, which tries to explain the development of capitalism in different countries, from the economic ethics spread by the Protestantism and Catholicism (Weber, 2004), sees the entrepreneur as an ideal type, mentally constructed from an economic rationality with modern values.

Schumpeter (1961) defined entrepreneur as someone who seeks new combinations of elements to introduce production, process or product methods in the market, by identifying new export markets or supply sources and by establishing new organization types. From a classical analysis, this author also tried to show the role of the entrepreneurs to explain economic development, by distinguishing the economic entrepreneur of his time and the economic agent during the early years of capitalism, when both capitalist and entrepreneur were from the same category.

Methodology

The research population in this study consisted of owner-managers and employees of small, medium and large companies -retailers, services and factories - in the Federal District, Brazil. 33 companies, from 29 different business activities, were selected. This convenience sample consisted mostly of women (51.3%) whose age ranged between 16-67 (MODE = 19 years of age). 3.8% of the respondents had not completed primary school; 3.3% had completed primary school; 4.9% had not completed high school; 32.9% had completed high school; 20.0% were undergraduates; 22.4% had obtained a college degree; and the others held a master's, Ph. D or a specialization degree). 44.8% of the research participants are in charge of operational tasks, and 21.2% perform technical tasks. The majority, 61.6%, perform trading activities, and 33.3% are in charge of services. 42.4% of the companies in the sample are small enterprises; 30.3% are medium-sized, and 25.6% are large.

The data was collected from 450 respondents, and two instruments were adopted: the first one assessed culture from a range of values, and the second one assessed the entrepreneurial attitude, based on the Achievement, Power, Innovation and Planning dimensions.

The participants' responses to the questionnaire - owner-managers and employees from different levels of 33 different enterprises - were recorded without typos in an electronic database through the SPSS (Statistical Package for

Social Science) software, version 12.0. Descriptive and exploratory analyses were conducted to verify the data input, the distribution of missing data, sample size, extreme cases and the distribution of variables.

To identify the unvaried extreme cases, all variables were turned into Z scores. Those considered as extreme cases showed standard scores higher than or equal to 3.29, $p < 0.001$, two-tailed; multivariate extreme values were identified through the Mahalanobis distance ($= 0.001$) (Tabachnick and Fidell, 2000). 129 unvaried extreme cases and 24 multivariate extreme cases were found. The outliers were removed from the analysis due to their high occurrence. The best methodology would require parallel analyzes (clean data X outliers) but, in this study, the number of outliers is not enough for a regression analysis (Tabachnick and Fidell, 2000). The rejection of extreme cases was based on Tabachnick and Fidell (2000, p. 13), who stated that they have "little impact on the regression equation, so excluding, recovering or changing the variable is recommended".

Regarding response normality, the variables were not changed in asymmetry indices and flattening cases. According to Zerbini (2003) and Carvalho (2003), previous experiments did not show any difference in their analyzes due to a transformation of variables. Moreover, the transformations are not recommended for this type of study, as it is the results are likely to be difficult to assess (Tabachnick and Fidell, 2000).

The regressions were done in three stages: the first consisted of standard regressions; the second analyzed the mediation effects on the relationship between culture and entrepreneurial attitude; the third stage analyzed the mediation effects with the same variables. All univariate and multivariate outliers were removed from these regression analyzes. It is worth noting that all analyzes were done according to the cultural patterns found in the research on which this article is based, as a predictor of the Brazilian cultural pattern - horizontal collectivism.

Results and Conclusions

This article aimed to identify the relationship between the Brazilian culture and its entrepreneurial attitude. The results shown here were found through standard and hierarchical regression analyses, from which mediation and moderation tests were done with specific variables - type of activity, owner-manager, and company size. A convenience sample 450 people were analyzed, including owner-managers and employees from different departments in the company.

In this context, the culture variable was significant in the Horizontal Collectivism cultural manifestation. The surveyed subjects perceived their group as the source of their identity, and that their relationships were dependent-oriented. This result reinforces such perception, as it verifies a cultural trait identified by Freitas (1997, 44), who called it Personalism, in a "society based on personal relationships", or a "search for close, affective relationships, and Paternalism", i.e., moral and economic dominance. Such characteristic found in this study may be explained by Da Matta (1997), who he says that Brazilians build their relationships via social networks, represented by groups of friends or interests, clans, relatives. Furthermore, this research reinforces what Hofstede (1997, 52) found in his studies: Brazil as a collectivist society, characterized by "deep social networks" in which people differentiate their group, usually consisted of "relatives, clans and organizations."

This result assumes that, in a society with a cultural pattern such as the Brazilian, in which the State apparatus adopts a bureaucratic management system tending to patrimonial practices, the structure of most organizations subject their employees to a group and their power holders. Nunes (1997, 29) states that the entrepreneur is highly motivated to maintain the ties with relatives and friends, relying on their emotional support in times of stress, of need, or for a job search and career promotion. Ultimately, they are the ones who will show approval, confirming their success.

On the other hand, the horizontalism factor, identified in this study as the standard cultural indicator of the sample population, showed unexpected outcomes. Indeed, according to the studies of Hofstede (1997, 38), Brazil is seen as high distance power country, where class differences are noticeable.

The relationship between horizontal collectivism and the Power dimension showed moderation because the company owner is also a manager. It might be explained, according to Schwartz (1987), by the fact that the power holder aim to control personnel and resources. It explains why the business owner also works as a moderator, according to the perception of the sample population.

The tests did not show significant mediation and moderation results among the study variables. It is assumed, therefore, that only the culture factor, an expression of the Horizontal Collectivism pattern, showed significant results in the relationship, through a standard regression with the four dimensions of the entrepreneurial attitude dependent variable - Achievement, Planning, Power and Innovation. The fact that mediation was not detected in this relationship, and Culture was a direct predictor of entrepreneurial attitude, were explained by Da Matta (1984, 17), who sees culture as "a style, a manner and a way of doing things".

It should be highlighted here that this research was based on a sample of owner-managers and employees of small, medium and large companies in the Federal District from into 29 different business segments, with a total of only 33 companies. Therefore, it is convenient to mention here how difficult it is to research culture in such a huge country like Brazil, with clear regional differences and diverse ethnic background.

However, the relevant aspect of this study lies in its attempt to find explanations for a social phenomenon that has been included in the global agenda, especially in Brazil. Moreover, the demands included in this agenda and their intended solutions are characterized by a conflict between archaic and modern social, economic and institutional dynamics. As well as the cultural traits pertaining to the Brazilians' identity, which are found throughout this huge country.

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Business models and social innovation: the case of employee welfare services

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The paper explores how business model innovation can generate social innovation. It is commonly agreed in literature that the main engine of social innovation are innovative public policies involving, depending on the situation, both public and private actors or either of the two. The paper adopts a rather different perspective by focussing attention on how companies can generate social innovation and social spillovers investing on business model innovation. In particular, the paper explores organisational business model innovation focussing attention on the adoption of corporate welfare tools. Through a comparative case based empirical analysis, the paper measures the social impact of business model innovation through social return of investment (SROI) analysis therefore contributing to the scientific debate on the topic.

1 Introduction

The goal of the study is to explore how business model innovation can generate social innovation. In particular, the paper analyses the impact of employee welfare services introduction on the transition towards "social business models" or social strategies in private corporations.

Business model innovation can be activated by companies by evolving their value proposition, their set of activities and product/services offer, by redefining the set of actors that are contributing to their activity and, consequently the value creation and sharing systems that are adopted by companies (Amit et al., 2012). The introduction of a social perspective in management can contribute to the innovation in all the four areas listed above and, possibly allows companies to evolve their strategy towards what is commonly defined as social strategy that leads to social innovation.

It is commonly agreed in literature that the main engine of social innovation are innovative public policies involving, depending on the situation, both public and private actors or either of the two. The paper adopts a rather different perspective by focusing attention on how companies can generate social innovation and social spillovers investing on business model innovation. In particular, the paper explores organizational business model innovation focusing attention on the adoption of employee welfare services.

The adoption of this type of services generate an immediate social impact that can be measured in terms of social return of investment (SROI). SROI is a really relevant indicator, since it adopts typically a financial perspective to estimate the economic contribution of a social innovation like the introduction of employee welfare services on the company and, consequently, on the society as a whole. For this reason SROI can be considered as an indicator of social value.

The paper moves from a systematic analysis of literature on social entrepreneurship and business model innovation to identify an interpretative model that, by linking the above mentioned dimensions, explains how the introduction of welfare services can promote innovation at three levels: operations, strategy and society. Employee welfare services introduction, according to the model presented in this paper are an effective way to create a win-win strategy for workers, companies and the society as a whole.

2 Business model and business model innovation

Literature on management has dedicated a wide range of studies to the conceptualization of business models with specific reference to the dynamics of technological change and IT systems introductions. In particular, this approach was oriented toward the improvement of the understanding of the mechanisms that are contributing to economic value creation (Chesbrough and Rosenbloom, 2002). Only recently many scholars dedicated their seminal works to improving the definition of business models contents and identifying their main components. Business model has been defined by Zott and Amit (2010) as composed by content, structure and governance models that allow value creation through the exploitation of business opportunities. Also Casadesus-Mansell and Ricart (2011) identify as components of business models policy choices, asset choices and governance choices. Adopting a wider perspective, Osterwalder and Pigneur (2010) introduces a wider perspective focussing attention, not only on business models components but also on the rationale of how an organization "creates, delivers and captures value" (Osterwalder and Pigneur, 2010, p.14). The elements included in its model are wider, including value proposition, target customers, distribution channels, relationship, value configuration, core competency, partner network, cost structure and revenue model.

According to these authors models, business model innovation arises from an innovation activated in any of the components of business model or in its general concepts and philosophy. Traditionally the main engine of business model innovation is technology, even if also products, processes and value proposition can determine business model innovation. In the following sections of the paper, we explore the role and contribution to social innovation of an engine of business model innovation.

3 Social innovation and corporate welfare

The concept of social innovation is at the core of the debate within the European Commission. With the term “social innovation” literature refers to “a new solution (products, services, models, markets, processes, etc.) that simultaneously meets a social need (more efficiently and effectively than existing solutions) and leads to new or improved capabilities, assets and/or relationships” (Caulier-Grice et al., 2012). Accordingly, the process underlying social innovation implies change in the “product” (the nature of the services offered) and in the ‘process’ (who provides the service and with what resources), which are distinguished from the rest of the initiatives in the social sphere due to the fact that they would be able to improve the quality of life of individuals in the long term. Among the actors of social innovation an important role can be played by the private firms, which have the potential, in terms of economic and organizational resources, to implement those business policies in favour of sustainability - social and environmental - that fall today in the wide concept of Corporate Social Responsibility (European Commission 2001).

The employees welfare, or “second welfare”, is an example of “laboratory for social innovation, that consists of the initiatives of a diverse set of actors - from the third sector to local authorities, from for-profit enterprises to trade unions, from private insurance enterprises to social funds - that are intended to define new processes, models and services to respond to the needs of society. Moreover, research has shown that an escalating number of employers now recognize human capital as a valuable resource and consequently there is an increasing realization that employee personal wellbeing is an important determinant of organizational prosperity (Appelbaum and Shapiro, 1989).

The employees’ welfare is generally understood as the set of benefits and services provided by the company to its employees in order to improve their work and private life (Titmuss, 1958, Greve, 2007). Growing space within companies, but also in public administration, is occupied by the sphere of work-life balance (Burnett et al., 2013). From the point of view of the firm, employees’ welfare is within the compensation & benefit systems, but differs from traditional fringe benefits for the purposes for which they are supplied by the employers. In the first case, these are services offered to specific groups of employees and their aim is the improvement of employee’ working conditions. In the case of corporate welfare the same services are part of variable remuneration policy instruments that the employers usually offer to a wide audience of employees to improve their purchasing power and living conditions more in general.

The employees’ welfare services, or Employee Assistance Programms - EAPs (Davis, 1996 and Gammie, 1997), can be grouped into several categories. The first, is that of sustainable mobility, including facilities for parking, company car, and / or rental of cars at subsidized prices, without forgetting the reimbursements or fuel, but also conventions for the equipment to their employees smartphones, personal computers, etc.. The second group of services is that of health care assistance and pensions. A third area of intervention is related to purchasing, financing and loans, including mortgages and/or low-interest loans, incentives for opening bank accounts and the ability to make purchases in participating stores. The last area, including professional services, wellness and leisure, family and utility services, are all the programs, which are aimed at improving the work-life-balance of the labour force. The employees’ welfare plan and the weight of each area of services depend on many external and internal factors, such as developed cultural norms apparent in the benefits offered by government and private entities in a local market, as well as managers own cultural predilections (Cravens and Oliver, 2001)..

Welfare plans are often the results of a virtuous interaction of different actors, and in particular between the firm, regulatory authorities, employees, labour unions and even society as a whole (Oliver e Cravens, 2001). Empirical literature has highlights that the development of employee’s welfare plan within companies can follow two main different paths, implying different level of engagement of both employers and employees: the first, is a process mainly shared between the firm and the labour unions while the second is carried out unilaterally by the firm (Mallona, 2012). A part from the path chosen, the development of an employee welfare plan is an usually an iterative process composed by four main phases (1) needs’ assessment, (2) program design and model selection, (3) implementation and (4) evaluation. What emerges, is that the first and the latter phases are both crucial for both organizations and employees to achieve positive results with a corporate welfare plan (Davis and Gibson, 1994)..

Considering the outcomes of employees’ welfare plans, they represent a win-win-win strategy for the community, firms and workers. Indeed, the employees’ welfare plans respond to a subsidiary integration function to the public, by solving the needs of various types of workers and their families through the grant of companies’ private resources, while the benefits for employees are mainly linked to improvements in work-life-balance and quality of life, reduction of stress factors, increasing of job satisfaction (Carniol, Cesarini, Fatali, 2012). Corporate welfare plans also represent a strategy for the firm to attract, motivate and retain human resources. The literature leads the employees’ welfare services to the High Performance Work Systems (HPWS), which are a group of work organization and human resource practices which can simultaneously improve the wellbeing of workers and the firms’ performance (e.g. Appelbaum et al. 2000; Arthur, 1994; Becker e Gerhart, 1996; Delery e Doty, 1996; Huselid, 1995; Koch e McGrath, 1996; Lawler ed altri, 1995; MacDuffie, 1995; Pfeffer, 1998; Youndt, Snell, Dean e Lepak, 1996). Accordingly, the provision of employees’ welfare services would allow the organization to improve the committment of its employees and reach positive effects on workers turnover, absenteeism and productivity (Wood e de Menezes, 1998).

4 Social innovation and employee's welfare services as a driver of business model innovation

Some authors have explored the relationship between social innovation and business model innovation. In particular, they have used business model methodology to analysis new forms of business generated by social and socially responsible businesses. In particular, many of these contributions have focussed their attention on social entrepreneurship. According to Mair and Schoen (2005) successful social entrepreneurship is determined by common features and patterns around core strategy, strategic resources, customer interface and value network. Similarly Marquez et al. (2010) developed a concept of inclusive business model on the base of the business model canvass elaborated by Osterwalder and Pigneur (2010). In their elaboration value proposition, the distribution channel, the relationship with the customers, the partner network and the revenue model are the key elements involved. Also in the approach proposed by Yunus et al (2010), social business model is described in terms of value proposition, the social profit equation, the value constellation and the economic profit equation. There are other authors that have focussed their attention on assessing the difference between social and socially inclusive business models.

Regardless of the different approach adopted by various scholars, what emerges is the role of social orientation, social inclusion and social responsibility as a relevant engine of business model innovation that is producing the growth and development of a plurality of new ventures. In fact, the adoption of social orientation as an approach in doing business impacts on the various components of business models forcing companies to introduce new elements that in certain case can lead to the growth of totally new businesses, as in the case of social enterprise. If social innovation is conceived as one of the engine of business model innovation, there must be a continuum between business models, socially responsible business models and social businesses (Figure 1 and 2).

If social innovation is conceived as one of the main engine of business model innovation this must have an impact on business performance measurement models, also including social performance value creation.

The debate around the measurement of social value and social performance is very articulated and the methods proposed in literature are really wide and varied. In Table 1 is proposed a map of the most commonly used methods. This variety witnesses the inadequacy of the different methods that are used. In particular it must be observed that in reality many measurement systems are not used in reality by companies and even SROI (Social Return on Investment), that is often indicated as the most commonly used method, is not so diffused. Therefore improving the understanding of the diffusion of these methods of performance measurement is relevant and will be explored in the empirical section of this paper.

Within the context of this paper we will focus our attention on a specific type of social innovation represented by the introduction of employees welfare services into companies. The scope of this type of innovation is usually more limited in scope then social innovation conceived in a broader sense and as presented in the previous paragraphs. However it is important to stress how employees welfare services innovation can have a positive impact on people's motivation as well as on corporate reputation. As illustrated in Figure 3, corporate welfare services can have an impact on the organisation level of the business model, where a business model is described in terms of operating level, including product, process and activity innovation, organization level, including organization planning and management and people management and, finally, the strategic level, including content/value proposition of the activity, structure and governance models.



Figure 1. The relationship between business innovation and social business innovation.

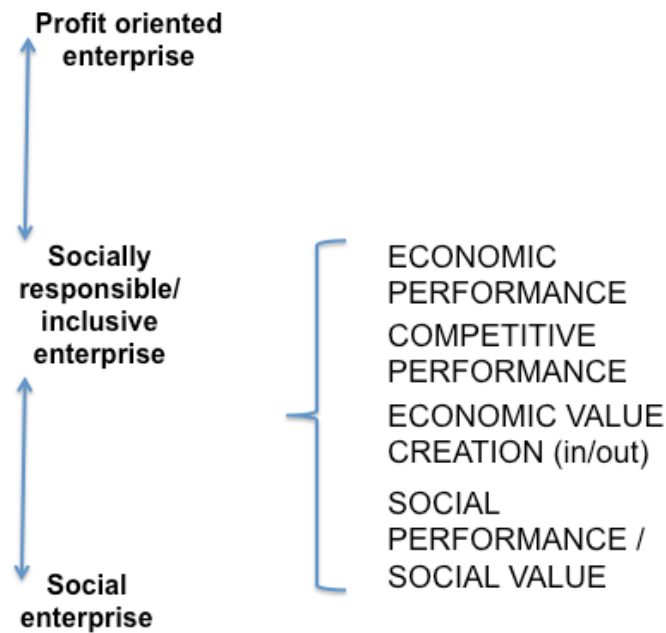


Figure 2. Business performance measurement models.

Table 1. Methods for social value measurement.

METHOD	DESCRIPTION	EXAMPLE	PROBLEMS
Cost-Benefit Analysis/ Cost-Effectiveness Analysis	The most widely used family of tools; counts up costs and benefits (usually using some of the methods described below), and then applies discount rates. Often used for large public programs.	A recent study in the United Kingdom found that using a mix of drug treatment, surveillance, and behavioral interventions instead of prison saved taxpayers up to \$130,000 per offender (and up to \$300,000 if savings to victims were included). ¹	Disagreements about the actual numbers and weightings in the calculation, as well as the conclusions of the analysis.
Stated Preferences	Asks people what they would pay for a service or outcome.	A typical example would ask people what they might pay to preserve an endangered species or to build a park.	Stated preferences often do not correlate with actual behaviors.
Revealed Preferences	Examines the choices that people have actually made to infer the relative worth of different options.	A researcher analyzes house-buying patterns and real estate prices to infer how much people value public parks.	Few fields have enough usable data.
Social Impact Assessment/Social Return on Investment Assessment	Estimates the direct costs of an action, the probability of it working, and the likely change in future outcomes, sometimes with discount rates.	There are literally hundreds of tools of this kind, including Acumen Fund's Best Available Charitable Option Ratio methodology, Jed Emerson's blended value methods; and various Center for High Impact Philanthropy methods.	Disagreements about numbers, weightings, and conclusions; values; how to handle time and discount rates; and intended audience of the calculation.
Public Value Assessment ²	Judges how much the public values a service.	The British Broadcasting Corporation assessed its public value.	Not rigorous enough.
Value-Added Assessment	In education, assesses how much a school adds to the quality of its pupils.	Recent uses often show that apparently successful schools are actually good at attracting clever pupils.	Sometimes too complex for parents or the media to understand.
Quality-Adjusted Life Years/Disability-Adjusted Life Years Assessment	In health care policy and research, accounts for patients' objective health and patients' subjective experiences.	Widely used set of measures. Provides a common way to judge the relative effectiveness of clinical treatments and public health measures.	Can be controversial when a particular treatment is not cost-effective.
Life Satisfaction Assessment	Judges social projects and programs by how much extra income people would need to achieve an equivalent gain in life satisfaction.	An imaginative study in Wales showed that modest investments in home safety, which cost about 3 percent as much as home repairs, generated four times more life satisfaction. ³	New approach that remains unproven; highly sensitive to input assumptions.
Government Accounting Measures	In government, accounts for government spending and its effects.	France's <i>bilan sociétal</i> is a set of 100 indicators showing how enterprises affect society. Italy has a similar <i>bilancio sociale</i> .	Much variability across regions; disagreements about which indicators to include.
Other field-specific assessments	Every field has its own cluster of metrics.	A recent Young Foundation study identified nearly 30 measures of value in the built environment, including artificial neural networks, hedonic price models, fuzzy logic, autoregressive integrated moving averages methods, and triple bottom line property appraisals. ⁴	Diversity of these measures means that they are little used for public decision making.

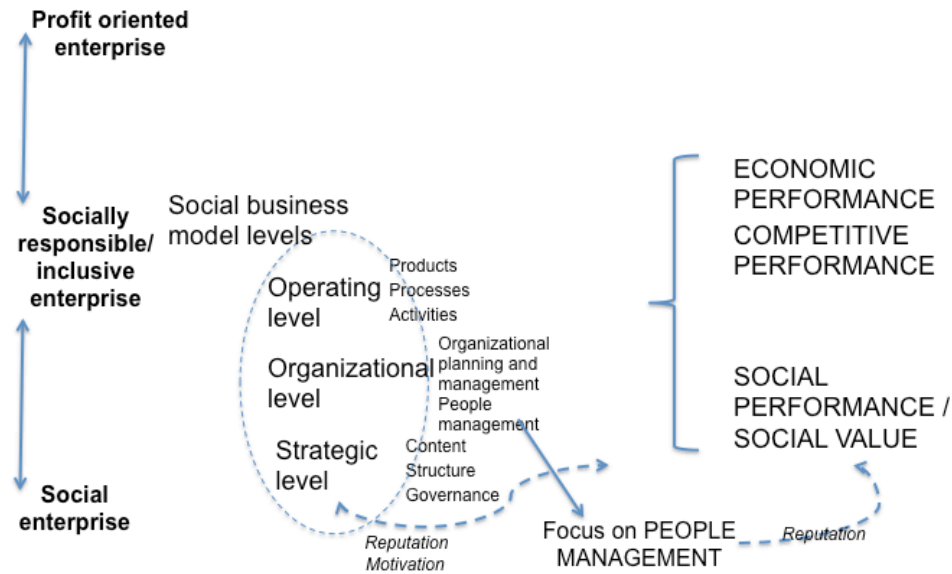


Figure 3. Employees welfare services as engines of innovation.

Figure 4 illustrates how employees welfare services can have an impact on corporate performance and specifically on corporate social performance. Employees welfare services increase employee satisfaction, therefore positively impacting on employees motivation and involvement. An increasing motivation and involvement than has a positive impact on productivity and product/service quality. This activated positive note that is so increasing customer satisfaction and loyalty and therefore reputation that contributes to increasing revenues and enlarging customer base.

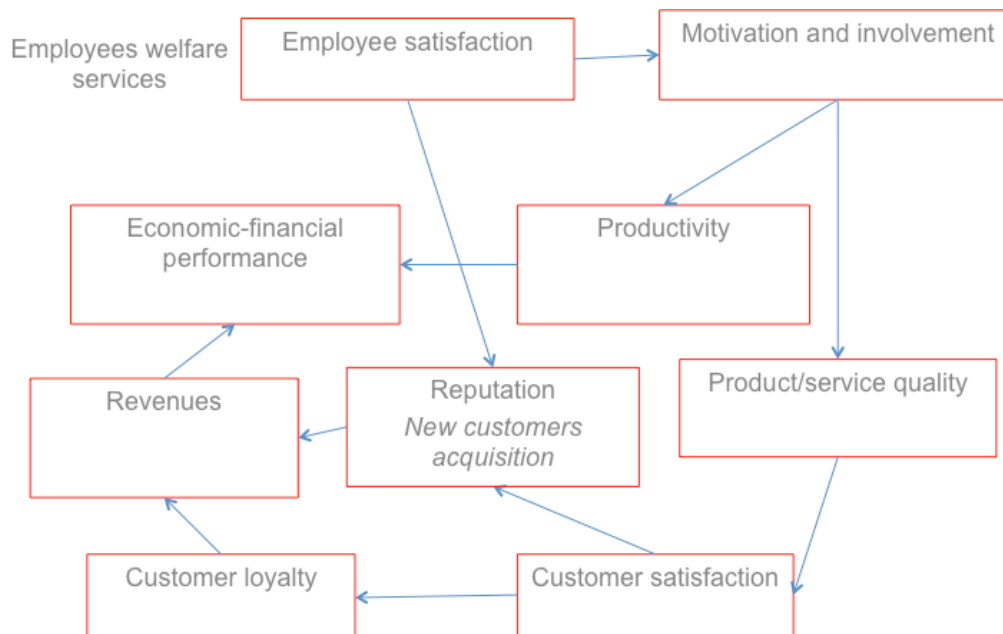


Figure 4. Employees welfare services and corporate performance.

As far as business model innovation is concerned an increased motivation and involvement contribute then to a higher productivity of employees determined by their involvement in processes innovation but also to product and services Improvement obtained by introducing bottom up innovations. Because of this mechanisms employee welfare services can be considered as one of the engines of business models innovation and on of the main drivers of social and socially responsible business models innovations.

5 Methodology

The empirical analysis is conducted on a sample of 67 Italian companies listed in the STAR segment in Milano Stock exchange. STAR is the market segment of Borsa Italiana's equity market (MTA) dedicated to midsize companies with a capitalization of less than 1 billion euros, which voluntarily adhere to and comply with the following strict requirements:

- High transparency and high disclosure requirements
- High liquidity (free float of minimum 35%)
- Corporate Governance in line with international standards (i.e. a set of rules that determine the company's management)

The companies listed on STAR are leaders in their industry and they represent Italy's economic diversity and strong competitiveness. On April 30, 2013, the 67 companies listed on the STAR segment represent 26% of Borsa Italiana's MTA listed companies. The choice of the sample allowed us to work on a sample of companies that have a smaller size than those that has been analysed in other studies on social innovation and at the same time they represent an interesting observatory because of the excellence in management.

The data collected using secondary data (company reports and presentations, social reports and articles published on the main Italian economic magazines in the last three years on the companies) on the sample are aimed at mapping systematically:

- the degree of diffusion of employee welfare services within companies;
- the type and the pervasiveness of the welfare services adopted (i.e. Type of services, variety, coverage, etc.);
- the relationship among employee welfare services offer and the development of socially oriented business model innovation (therefore exploring the link between corporate welfare and social strategy).

The analysis is completed by the comparative analysis of 5 cases of best practices of socially oriented business model innovation and social performance and impact. The cases have been selected on the base of their reputation as being regarded as examples of excellent introduction in their company of innovations that had a relevant social impact.

6 The diffusion of employee welfare services: the case of Italy

Over the past 40 years, the need for welfare in Italy has changed dramatically as a result of irreversible trends (Mallone, 2012), such as increased life expectancy and the aging of the population, reducing the number of women at work, but also to "elderly "at work, due to the rise up of the retirement age and the disappearance of the large and enlarged family model, which served as a natural and essential support for descending and ascending. Over the past two decades in Italy there is a policy of containment of the "public welfare" undertaken to achieve the objectives of reducing the deficit, which has generated an increasing need for supplementary benefits, not only in the field of supplementary pensions and health care assistance, but also and especially in the services in favour of workers and their families. In light of these trends, in Italy, and in particular at local levels, over the past years substantial public funds has been allocated to finance private companies wishing to adopt supplementary welfare plans, or even the creation of networks of partnerships between small and medium enterprises who wish to cooperate in the development of welfare services targeted to their employees.

The employees welfare services in Italy are not a new phenomenon but were born in the 50s' as an expression of "paternalism" of some large multinational companies (Amatori, 1980; Benenati (1993, 1999). In recent years, however, the corporate welfare has changed, becoming a tool for strategic human resource management with a value of both economic and social nature, designed to meet the needs of workers, reduce costs and improve the organizational performance. Indeed, under the pressure of a growing demand for welfare services by workers and the containment of public expenditures, and in light of the significant tax benefits recognized by law, an increasing number of companies in Italy is enriching the corporate welfare system available to its employees, adopting a policy of total-reward, in which tools of monetary type (salary and variable remuneration) are complemented by non-monetary instruments (benefit and perquisite) to pursue the objectives of fiscal optimization, human resources loyalty, motivation and attraction and building a solid and lasting corporate identity.

A recent survey of more than 300 Italian companies showed that, even excluding supplementary social security, the phenomenon of employees' welfare affects more than 80% of companies with more than 500 employees (Ascoli, Mirabile e Pavolini 2012). About 37% of large companies also offers at least four different types of performance, while 43% include two or three welfare services. The supplementary pension is present in the vast majority of the companies, while among the benefits to medium-low and low diffusion are the interventions for the reconciliation of family and work, those in the field of nursing and long-term care as well as access to housing.

Assolombarda, an association of entrepreneurs, in 2010 undertook a research which relates to the spread of corporate welfare between firms in Lombardy Region. From the reference sample, consisting of about 400 companies, emerges that the welfare initiatives are more frequently present in large companies (88%), while they drops drastically up to 12% of the total, when considering the small and medium enterprises (with less than 250 employees). It has been also highlight that there are different paths and behaviours between large and SMEs in the way employees welfare is introduced: in the firsts, it prevails an agreed decision, through enterprise bargaining agreement or single/multiple agreement; in the seconds, it is more often the result of an unilateral decision of the company.

According to the study conducted in 2013 by McKinsey, the welfare system is very much appreciated by the workers, who "evaluate" it up to 70% more compared to the cost incurred by the company. Accordingly, the "employee engagement index" of workers increased by 30 per cent when the welfare plan is introduced, and by 15% when an existing service is improved (ValoreD, 2013). Research also shows, that both men and women appreciate the corporate

welfare schemes. In particular, more and more persons would like paid parental leave, and that the needs vary considerably depending on the 'positioning' along the life cycle: if within people between thirty and forty years the needs connected to the care of children are the most cited, from fifty onwards workers feel higher the need to help elderly family members.

7 The diffusion of employee welfare services: the empirical analysis

The data collected on the sample of companies included in the star segment show that only a limited number of them (about 30%) publish a social report on a regular base but only 50% of them publish a certified social report. The majority of the companies have a section of their corporate website that is dedicated to social responsibility in terms of activities involved, environmental and green management. The data that is really surprising is the limited space that is dedicated to employee's welfare services both in official reports and corporate websites. Data Have been collected also on social performance measures adopted by sample companies. Also here a surprising data is represented by the fact that only 10% of them use any type of performance measure while the remaining do not declare to use any.

In the second phase of the analysis we focussed our attention on a subsample of 5 companies also including companies that were not listed in STAR segment but were commonly renowned by media as social innovators in their respective fields, with specific reference to employees' welfare services. The cases are presented below.

7.1 Luxottica

Luxottica Group is a leader in the eyewear sector of high-end, luxury and sports eyewear, with over 7,000 stores operating in both the optical and sun in North America, Asia-Pacific, China, South Africa, Latin America and Europe. The company is based in Italy and counts 1,039 employees.

The "welfare package" for employees of Luxottica includes the "shopping card", the health insurance policy, reimbursement of textbooks and several scholarships for the children's of the employees. The decision to set up an employees' welfare system in Luxottica is the result of two parallel forces: on the one hand, the willingness of the entrepreneur to provide support to workers at a time of economic crisis; secondly, to create a "virtuous circle of quality" that can generate resources for employees through a general improvement of labour productivity.

The project was launched in 2009 and has been developed within a Governance Committee, which is a bilateral body company's and unions' representation, which has established an indicator related to the increase in the production of quality according to which the resources for welfare are periodically allocated. Since the introduction of the employee's welfare system in 2009, the quality of production has improved continuously through waste reduction, lower absenteeism rates and greater attention of workers to the processes' efficiency.

Luxottica shows a strong attention to sustainability and then to the social and environmental impact of the business. It emerges clearly from the mission which states that the aim of the company is that to concentrate on eye protection and enhancement of the faces of women and men in the world, producing and selling sunglasses and eyeglasses high technical and of stylistic quality, in order to maximize the well-being and satisfaction of consumers, by respecting the environment. In light of the declared values, the company has been active in recent years on a number of social responsibility projects. In particular, Luxottica has founded One Sight, an independent non-profit organization which is committed fight the global crisis of eye care. Then, the plan for the welfare of Luxottica is part of a human resource management system which includes many initiatives promoting quality of work and the personal and professional development of its employees.

7.2 Nestlé Italia

Nestlé, the world leader in the food industry, employs 280,000 persons in more than 100 different nationalities. Over a third of the workforce is located in Europe (33.9 per cent), 38 per cent in the Americas and 28.1% in Asia, Oceania and Africa. The group has been active in Italy since 1875, where he is now the first company in the industry.

The "jewel in the crown" of welfare in Nestlé is made by the project "90 days", for which the company has won the award in 2011 ("Family and Work") in the Region of Lombardy. It includes dedicated areas for the children of employees during the holiday periods and the schools' closing periods, two nurseries, the union agreement for the flexibility of-time and telecommuting, as well as the signing of the Charter for voluntary equal Opportunities promoted by the Ministry of Labour, Ministry of Gender and the non-profit organization – Sodalitas.

Creating Shared Value (CSV) is the principle behind the activities of the Nestlé Group, according to which, to be successful in the long run, a company must create value both for itself and for its shareholders and for society in which it operates, bringing tangible benefits to the people, economy and territory. The Nestlé in Society Board, chaired by the CEO, oversees the strategic implementation of Creating Shared Value across the businesses and it leads the development and evolution of the CSV, environmental sustainability, and all societal objectives and strategies. To feed the corporate culture and create shared value, Nestlé promotes the sustainable development throughout the overall production process and invests from many times in the welfare of its employees. Crucial in the sustainability strategy are the priorities that the Nestlé Group establishes for Europe in the field of human resources, and in particular the all gender balance, employee branding and social compliance. In this regard, the corporate welfare is a practical tool that

the company uses to achieve objectives such as the improvement of working conditions of female employees, the image of the brand and, last but not least, the company attractiveness for workers.

7.3 SEA Aeroporti Milano

The SEA Group is the company that plays the role of manager of the airports of Milan Linate and Milan Malpensa from 1948. The group consists of 14 subsidiaries that operate in four different business areas: aviation, non-aviation, handling and power, with a total number of employees that is 4,854.

The employees' welfare plan of SEA, entitled "SEA for you," is aimed at all employees and consists of 16 initiatives related to 5 macro areas: work-life balance, health, protection and prevention, social services, recreation and Education. The project was developed in 2011 as part of a broader process of reorganization and provides for the active participation of trade unions in all phases of design and implementation. The aim of the welfare project was to support the purchasing power, improving the relationship between working time and free time, contribute to the welfare of those who work in the company, as tools to support the development of the company. The main feature of welfare in SEA is to the governance model which is based on the relationship between three entities, two of which are managed through a bilateral body with equal representation of the company and the employees.

The SEA Group's strategic vision is based on the criteria of sustainable generation of value, considered in its multidimensionality (economic, environmental, and social) and a view based on the mutual reinforcement of the three components. To this end the company has entrusted the governance planning and decision-making on sustainable development at the Group Sustainability Committee, chaired by the President and Chief Executive Officer and convened semi-annually with the participation of the Chief Corporate Officer, Chief Operating Officer and Deputy CEO, Chief Financial Officer and Directors of many organizational functions. In accordance with the company's sustainability vision, SEA is engaged from many years in the development of sustainable innovations, which the company has divided into 3 main areas: sustainability and economic competitiveness, environmental sustainability, social and economic sustainability. Moreover, in its annual sustainability reports SEA report on the evaluation of the projects developed, using a set of indicators, which allow monitoring each of the three areas.

7.4 Tetra Pak Packaging Solutions

Tetra Pak, founded in 1951 by Swedish director Ruben Rausing, now operates in more than 190 markets and has over 20,000 employees worldwide. The Modena headquarters of Tetra Pak Packaging Solutions in Italy is the engineering company of the group that is engaged in research, development and manufacture of machinery for the packaging of liquid food products and employees more than 800 persons.

The starting point for the development of the employees' welfare system in Tetra Pak is the Nordic culture and tradition of "family" that has produced a consistent basis over time to "focus on people," found at the corporate level. The management of the office in Modena has launched in 2009 a plan of corporate welfare in collaboration with the unions, after a careful analysis of all possible innovations to be introduced in relation to the budget allocated by the company. The welfare plan of Tetra Pak includes many employees' welfare services, such as the integration of maternity treatment, a flexibility plan, conventions and services in-house, a nursery, a package of insurance for accidents at work and outside, large interventions and hospital admissions, reimbursement of expenses for visits, eyeglasses and medication, for the employee and his family, complementary pensions, reimbursement for study, training, sports and travel expenses.

Tetra Pak defines itself as a "responsible society" for the attention that it addresses to the environment and the welfare of its employees. The governance of Sustainability has been entrusted to the Global Leadership Team, which is supported by the Corporate Governance Office and a network of local governance, risk and compliance officers. In addition to the employees welfare services, the company is also active in the field of social and economic sustainability, through partnerships with non-government organizations and government organizations, developing projects and initiatives which have transformed the overall value-chain: for example, in the recent years, the company has developed more renewable packaging and leaner food processing and filling solutions, increased efficiency and reduced operational impacts as well as helped customers reduce theirs, and created benefits for labour force by supporting the wider development goals of its employees.

7.5 Unipol Assicurazioni

Unipol is an Italian company providing insurance services which was founded in 1961 by the automaker Lancia and then purchased in 1963 by a group of cooperatives located in Emilia Romagna Region.

The project of Unipol for employee's welfare services was started in 2013 and jointly developed by the organizational functions "Sustainability" and "Internal Communication". The welfare services are provided to all the employees and it can be divided into two levels. The first relates to all the initiatives related to income support and support for persons, such as health care and the pension fund. The second relates to the core business including insurance coverage and services that the company offers to employees of the Group on concessional terms.

For the Unipol Group, sustainability is firmly integrated into the way it does business, thanks to a management that combines economic value creation, strengthening governance, environmental protection and social responsibility. Indeed, the Unipol Group has formalized its commitment to sustainable and long-term growth in reference documents for operating procedures in various business areas consolidating coherence with its values and principles.

With reference to sustainability, Unipol has introduced new products to better meet the needs of industry and it has innovated the existing products, adapting them to market changes and the needs of individuals and businesses. Moreover, the company has developed new services and improved the services that already exist, by including the stakeholders' point of view and it has managed the relation with the employees in a sustainable way for individuals and for the company, with a particular attention to the enhancement of diversity and protection of the individual. Furthermore, it has supported the community where operates, by supporting the development, social cohesion, the production and dissemination of culture. Finally, the company each year makes public the company's sustainability results, which are measured by specific indicators identifying the economic, social and environmental performance.

8 Discussion

Table 2 and 3 presented below provides for a synthesis of the comparative analysis of the selected best practices.

Table 2. Employees welfare services offered.

	SECURITY	FINANCING/ LOANS	PROFESSIONAL SERVICES	WELFARE/ FREE TIME	FAMILY	RESTAURANTS	PUBLIC UTILITY SERVICES
Luxottica	Contribution to health care costs			relax areas, bank hours	contribution to medical costs, social assistance, support and contribution to school and kindergartens, scholarships for deserving students, support for summer camps, babysitting service on demand; job sharing		shopping card to purchase grocery products for daily use
Nestlè Italia					teleworking and agile work (on demand), maternity and paternity kit	nurseries	
SEA Aereopori Milano	Cash assistance , extra professional accident insurance , prophylaxis, medical check-up, prevention campaigns, Spa Treatments		Voucher for study expenses	Summer camps for children and adolescents, summer camp at the beach or in the mountains for children and adolescents, cash for toy, cultural and leisure travel organization	Permits for specialist visits; Part-time "mother"; Flexible hours, Mobility home-work		Listening and help, help desk for seniors

	SECURITY	FINANCING/ LOANS	PROFESSIONAL SERVICES	WELFARE/ FREE TIME	FAMILY	RESTAURANTS	PUBLIC UTILITY SERVICES
Tetra Pak Italiana Spa	shuttle bus	healthcare plans, supplementary pension			company gym	Cover of medical expenses for specialist visits, summer programs, refunds for sports and training, support for enrolment in kindergartens or nursery business	Company's restaurant
Unipol Assicurazioni	Pension fund and health care found			agreements with beauty salons and hairdressers	care services and home care agreements with centres of hospitality and nurturing, educational services and entertainment for children during the summer		Laundry and tailoring of minor repairs , shoe repair service, pick up and return the car in the company by mechanics and tire shops, pharmacy

Table 3. Employees welfare services offered.

	VALUE PROPOSITION INNOVATION	NEW ACTIVITIES INTRODUCED	ORGANIZATION MODEL	STAKEHOLDERS INVOLVEMENT USED	SOCIAL IMPACT MEASURES
Luxottica	Luxottica Group's mission is to dedicate eye protection and enhancement of the faces of women and men in the world, producing and selling sunglasses and eyeglasses high technical and stylistic quality in order to maximize the well-being and satisfaction of consumers, in an environmentally	Managing employees with attention to personal and professional growth needs; sustainable innovation projects through OneSight	One Sight (non-profit organization), Governance Committee (a body corporate and union representation bilateral)	Not available	Quality of production (waste reduction, absenteeism, process efficiency)
Nestlè Italia	The principle behind the activities of the group is "Creating Shared Value"	Sustainable development throughout the production process; investments in the well-being of its employees	Nestlé in Society Board	Annual Stakeholder convening	Environmental impact indicators, indicators of organizational performance, subjective well-being of employees
SEA Aereoporti Milano	The Group's strategic vision is based on the criteria of sustainable generation of value, considered in its 3 components: economic, environmental and social.	Development of projects for economic, environmental and social sustainability	Corporate Social Responsibility Unit, Group Sustainability Committee	Customer satisfaction, Stakeholders' annual survey; multi-stakeholder workshop	Indicators of economic-competitiveness, environmental sustainability indicators, indicators of socio-economic sustainability

	VALUE PROPOSITION INNOVATION	NEW ACTIVITIES INTRODUCED	ORGANIZATION MODEL	STAKEHOLDERS INVOLVEMENT USED	SOCIAL IMPACT MEASURES
Tetra Pak Italiana Spa	The company believes in a responsible industry leadership, creating profitable growth achieved in harmony with environmental sustainability and with our sense of social responsibility.	Innovation along the overall value chain: more renewable packaging and leaner food processing and filling solutions, increase efficiency and reduce operational impacts as well as help customers reduce theirs, and create benefits for labour force by supporting the wider development goals of its employees	Global Leadership Team is responsible for the framework, supported by a Corporate Governance Office and a network of local governance, risk and compliance officers.	Partnerships with non-government organisations (WWF, Thai Red Cross Society, GAIN) and government organisations (United Nations Global Compact)	Not available
Unipol Assicurazioni	The aim of the company is to ensure sustainable and long-term growth, accompanied by an adequate profitability for the benefit of all stakeholders: shareholders, customers, agents, employees, suppliers and communities.	Action for the recovery and rehabilitation of degraded areas of the country, interest-free loan to pay premiums in instalments cars, construction of a port in an environmentally sustainable investment plan, experimental process of certification of insurance products, life insurance.	Unipolis Foundation, Sustainability Committee / Ethics Committee, Ethics and Social Responsibility function (RES),	Partnerships with non-profit organizations (Freedom, Legambiente, BITEB, Gaia), participation in national and international networks (Procurement & Sustainability, CSR Manager Network, Forum for Sustainable Finance), organization of workshops on the territory	Indicators of economic, social and environmental sustainability

The data analysed reveals how deep and pervasive is the impact of employees welfare services on the business model of those companies who have adopted them intensively, also interiorising a deep social orientation that is also involving environmental as well as community social issues. Those companies who introduced a variety of employees welfare services have also introduced innovation in their business model that are directly associated with the latter. In particular the major impact is on business model value proposition and on stakeholders involvement model. In terms of social impact measures adopted, interestingly companies tend to focus on the measurement of sustainability impact rather than involving other areas of analysis and social impact. This element seems to confirm the relative difficulty in diffusing shared and easy to use social impact measurement systems.

9 Conclusions

The theoretical model and the empirical analysis has allowed to improve the understanding of the mechanisms that generate social innovation promoted by companies. In particular the paper highlights the role of employees' welfare services as one of the engine of business model and social innovation. Furthermore, the paper provides a complete and systematic picture of the introduction of employees' welfare services in Italian companies and a measure of their economic and social impact.

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Do KIBS make manufacturing more innovative? An empirical investigation for four European countries

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Abstract

The paper aims at estimating the innovation impact of the vertical integration of knowledge intensive business services (KIBS) into manufacturing. Referring to the vertically integrated sectors of an economy allows innovative knowledge, which is transferred directly and indirectly from KIBS to manufacturing in an embodied way, to be measured. Its impact on manufacturing innovation is then estimated. By merging OECD data on sectoral R&D and input-output tables with sectoral patent applications from the Pastat dataset, a panel of 18 manufacturing sectors is built up for the four largest European countries – France, Germany, Italy and the UK – spanning from the mid-90s to the mid-00s. The more innovative sectors are actually those making more intensive and extensive use of R&D embodied into KIBS production flows. In policy terms, strengthening the bridge between KIBS and manufacturing appears to be as crucial as supporting KIBS activities and service innovations.

Keywords: KIBS; vertically integrated sectors; embodied R&D flows.

JEL codes: L60, L84, O33, O32, P00.

1 Introduction

Two decades after the seminal contribution by Miles et al. (1995), Knowledge Intensive Business Services (KIBS) are still attracting a lot of attention. New important insights have been obtained about their role at different levels of analysis: micro and sectoral (e.g. Tether, 2005; Corrocher *et al.*, 2009; Consoli and Elche-Hortelano, 2010; Doloreux and Shearmur, 2010), urban and regional (e.g. Tödtling *et al.*, 2006; Savi and Lawton-Smith, 2013; Antonietti *et al.* 2013; Shearmur and Doloreux, 2014), macroeconomic and structural change (e.g. Mas-Verdú *et al.*, 2011; Hauknes and Knell, 2009; Di Cagno and Meliciani, 2005; Desmarchelier *et al.*, 2013).

A common aspect of these streams of research is the attention for the complex kind of knowledge-exchange that KIBS realise with their clients, especially with firms operating in manufacturing industries. Their knowledge interaction occurs through both disembodied and embodied flows, of codified and tacit knowledge, respectively, which overlap to a different extent with the production relationships between KIBS and manufacturing (Landry *et al.*, 2012)

The present paper focuses on and extends the investigation of “production-embodied” flows of knowledge between KIBS and manufacturing based on the use of input-output analysis (e.g. Baker, 2007; Tomlinson, 2000a, 2000b; Windrum and Tomlinson, 1999). In particular, it brings to it two pieces of value added. Firstly, rather than a simple input-output one, we adopt a more sophisticated vertically integrated approach based on the notion of subsystem. This perspective has recently proved quite useful in investigating the relationships between manufacturing and services, especially in the aftermath of the explosion of outsourcing practices from the former to the latter (Ciriaci and Palma, 2012; Montresor and Vittucci Marzetti, 2011). Secondly, rather than a standard production function approach to the impact of KIBS on the productivity of manufacturing (e.g. Antonelli, 2000; Katsoulacos and Tsounis, 2000), we use a “knowledge production function” with a long tradition in innovation studies at the firm level (Griliches, 1979; Crepon *et al.*, 1998). Using this original framework of sectoral analysis, we aim at investigating the extent to which KIBS’ innovative knowledge enters into the manufacturing subsystems (or vertically integrated sectors) through production-based flows, and in so doing increases their innovation capacity.

An empirical investigation is carried out with respect to four large EU economies, whose KIBS have been shown to be pivotal and have different intersectoral patterns of vertical integration (Ciriaci and Palma, 2012; Windrum and Tomlinson, 1999), that is: France, Germany, Italy and the UK, for a period which spans from the mid-90s to the mid-00s. In order to do so, the OECD Input-Output and the ANBERD databases are combined and merged with sectoral patent applications coming from the Pastat dataset. In a panel framework, country, sector and time specific effects are thus controlled for.

The remainder of the paper is organised as follows. Section 2 illustrates the theoretical background. Section 3 describes the methodological approach, Section 4 the data used and the empirical application. Section 5 comments on the results and Section 6 concludes.

2 Theoretical background

In nearly twenty years of intense research, the analysis of KIBS has become enriched with several definitions and approaches (for a review, see Muller and Doloreux, 2009). Some of them focus on the actors (companies or organisations) that deliver the services at stake (e.g. Miles et al., 1995; Bettencourt *et al.*, 2002) and treat “a KIBS” as the supply of a qualified, knowledge-intensive service (e.g. Amara et al., 2009; Rodriguez and Ballesta, 2010). Other definitions instead address the nature of these service activities (e.g. Den Hertog, 2000; Gallouj, 2002b) and deal with “a KIBS” as a particular kind of economic sector, with an important role in promoting innovation and growth at aggregate level (e.g. Baumol, 2002; Oulton, 2001).

Although it also draws on the first one, this paper is grounded in the second research stream. Hereafter, KIBS will be thus meant as “a category of service activities, which is often highly innovative in its own right, as well as facilitating innovation in other economic sectors, including both industrial and manufacturing sectors” (den Hertog, 2000, pp. 504–505).⁷⁴

This definition directly points to a function of KIBS, which is the focus of this paper (on the array of KIBS function, see Den Hertog and Bilderbeek, 2008). KIBS carry on key-activities in innovation systems (e.g. Muller and Zenker, 2001; Tether, 2005). Not only are they innovative *per se*, as they introduce new marketable services and technological applications. They also act as knowledge carriers with respect to other sectors, especially manufacturing ones, and in this way they work as “innovation propellers” at the system level (Castellacci, 2008).

Knowledge transfer constitutes the core activity that KIBS play (especially) with respect to manufacturing sectors (Leiponen, 2006). This is a manifold activity, which involves KIBS in the generation and diffusion of different types of knowledge, both codified and tacit, for developing problem-specific and innovative solutions to their manufacturing clients (Landry et al., 2012). In this process, two aspects require special attention, possibly more than in the extant literature: i) the production-based transmission of KIBS knowledge; ii) the techno-economic impact of this knowledge transmission.

2.1 The “production-based” transmission of KIBS knowledge

The production and use of KIBS knowledge occur through frequent and specialised interactions between KIBS and their clients (Koschatzky and Stahlecker, 2006). Not only in the form of explicit (e.g. contractual) knowledge transfers and cooperation agreements, but also via production relationships, like exchanges of intermediate services, commodities and capital goods. This latter kind of production flows between KIBS and manufacturing is beneficial in at least two respects. Firstly, it conveys to manufacturing sectors a tacit kind of KIBS knowledge, which can’t reach them in other ways but through the embodiment in the exchanged items (Hauknes and Knell, 2009; Papaconstantinou *et al.*, 1996). One can think of the purchase of a newly (KIBS) developed software product that encapsulates some “unwritten” functions, which the (manufacturing) client discovers by exploring its use.

Secondly, the production interaction between KIBS and manufacturing can also affect the diffusion of codified KIBS knowledge, even in the absence of an actual embodiment. As regional and urban studies have largely shown, by getting involved in (repeated) market relationships, their partners can build up and increase their “cognitive proximity” (Boschma, 2005), augment the overlapping degree of their learning routines and mental frameworks, and become able to better understand and absorb the explicit knowledge they exchange (Montresor and Vittucci Marzetti, 2008). One can think of a (disembodied) consultancy KIBS deliver to a (manufacturing) client in order to improve its market strategic positioning, benefiting of the experience accumulated by interacting with it in the exchange of more ordinary services, like accounting, logistics support and HRM.

All in all, an important “production-based” (and not only “embodied”) transmission of KIBS knowledge to manufacturing can be identified, for whose mapping input-output tables of production flows represent an important analytical tool. Indeed, the input-output approach to KIBS is one the first to have been adopted (Tomlinson, 2000a, 2000b; Windrum and Tomlinson, 1999) and its use has been recently extended (e.g. Mas-Verdú et al., 2011; Hauknes and Knell, 2009; Rodriguez and Camacho, 2008; Baker, 2007). However, in this research stream little attention is paid to the “complexity” of the production relationship between KIBS and manufacturing sectors: in particular, to the fact that KIBS knowledge can reach a manufacturing sector on a production basis, both directly and indirectly. The relative knowledge flow occurs also through the contribution of the former to an intermediate input of the product of the latter, or to a further intermediate input of this intermediate input, and so on and so forth, in the classical Leontievan sequence of production rounds (Miller and Blair, 2009). The ICT service that has served to ameliorate the component of an electronic device, which is then used in turn by an R&D agency-consulting for a PC producer, is just an example of this indirect, input-mediated relationship.

⁷⁴ KIBS thus include business-devoted activities such as consultancy, research and engineering, which are characterised by intensive professional knowledge (i.e. a technical area or discipline) and are dedicated to other productive sectors (providing them customized problem solving), rather than to final consumption (Miles et al., 1995). A more precise account of the identification of these sectors will be provided in the next section. On the classification of KIBS see, among the others, Miles et al. (1995), Muller and Zenker (2001), Martinez-Fernandez and Miles (2006).

This is a crucial aspect, which requires a move from a simple input-output perspective, to a more structural kind of perspective, which looks at the actual vertical integration of KIBS into manufacturing for serving its final demand, by capturing the direct and indirect relationships of the relative sub-systems. In previous studies, such an approach has been used to show that the latest stages of structural change (and the crucial role of outsourcing in it) have made this vertical integration of services into manufacturing quite substantial, with important implications for the blurring of the sectoral boundaries between KIBS and manufacturing (Ciriaci and Palma, 2011) and for the tertiarisation extent of their hosting economies (Montresor and Vittucci Marzetti, 2011).

Accordingly, our first bit of hypothesis is that the vertical integration of KIBS into manufacturing, which is realised through the direct and indirect contribution of the former to the final demand of the latter, represents a significant map of their production-based knowledge flows.

2.2 The “techno-economic” impact of production-based KIBS knowledge

The majority of the studies that, in an input-output framework, have looked at the economic impact of “production-embodied” KIBS knowledge flows – to be sure, not that many with respect to those focused on their sole mapping – have focused on the productivity gains that client manufacturing sectors can have from them (Tomlinson, 2000a, 2000b; Barker, 2007).⁷⁵ This is the natural consequence of their exclusive focus on the embodied way in which KIBS knowledge is supposed to reach manufacturing, and of the way in which the standard “embodiment hypothesis” (Jorgenson, 1966) assumes the knowledge obtained by the producer – typically through R&D – spills over the user. Indeed, according to this view, the knowledge of the former would only create a rent for the latter, to the extent at which the price of the sold commodities that incorporates such a knowledge does not entirely reflect its actual higher quality/value. The translation of these “rent spillovers” (Griliches, 1982) into productivity gains would thus be the most direct effect of production-embodied (KIBS) knowledge.

However, if we follow the wider production-based transmission of the previous section, the impact of KIBS knowledge acquired in this way is not only economic, but also and above all technological, in brief, “techno-economic”. As we said, the production exchanges that input-output tables map are also and above all the source of important learning-by-interacting (*à la* Lundvall, 1992) between the producer (KIBS) and the user (manufacturing) sectors. Through it, the user can make an innovative use of both the R&D embodied in the correspondent transaction and of the R&D, which is transferred irrespectively from it (i.e. in a disembodied way). Anecdotally, the case could be of a client that, by acquiring an ameliorated software benefits from the R&D the relative KIBS has spent in this amelioration, by introducing an innovative product/process based on its functioning. Furthermore, the market transaction of the software could increase the cognitive proximity between the KIBS and the client and, in so doing, make the latter more capable of assimilating other disembodied knowledge inputs from the former. Finally, although not necessarily, in order to increase its “absorptive capacity” of the transferred embodied knowledge, the client might be willing to increase its own investments in R&D (Cohen and Levinthal, 1989) and, in so doing, augment its invention capacity.

Summing up, a wider approach to the KIBS knowledge which is transmitted to manufacturing in a production-based way, makes of the former an important additional input of the inventive capacity of the latter: as it might be revealed by its patenting propensity and/or patent outcomes. In other words, we can expect that such an exchange of knowledge gets functional to the problem-solving process the manufacturing client faces in its technological innovations, and increases its capacity of making an innovative use of the customised solution it purchases from the KIBS provider. In brief, by acquiring from KIBS business-devoted services necessary for the realisation of their final products, manufacturing firms also learn by interacting and acquire technical knowledge and customized problem solving experience, which can have a positive impact on their innovation capacity.

On the basis of the previous argument, the second bit of our research hypothesis is that, the more vertically integrated KIBS are into a certain manufacturing industry (sub-system), the more the relative firms will have opportunities to introduce innovative products for the final consumers of their sector.

As we will see (in Section 3), the first bit of our research hypothesis (in Section 2.1) will entail the adoption of a particular intersectoral perspective, which represents the first value added of the paper.⁷⁶ Similarly, the second bit of our hypothesis will also entail the resort to other variables than standard productivity ones, and that rather account for the inventive capacity of the manufacturing sectors. This is an additional value added of the paper, which address a relatively neglected KIBS impact.⁷⁷

⁷⁵ Although these production relationships can be anchored to both domestic and international trade flows, the problems of accounting for the tradeability of services (and KIBS) has determined a certain focus on the former. Among the recent studies which also retain the latter see, for example, Nisioka and Ripoll (2012), and those reviewed in this article.

⁷⁶ To start with, such an improvement is obtained by limiting the analysis to intersectoral flows of intermediate commodities only, and without distinguishing their domestic or foreign origin.

⁷⁷ A possible explanation can be the need, in order to actually measure the innovation impact of production-based KIBS knowledge, of plugging into the analysis a variable of innovation output at the sectoral level (e.g. patents), which can only be obtained from less directly comparable datasets (than those for relating R&D efforts to input-output flows). Furthermore, a dataset of diachronic nature, rather than cross-sectional, is required to investigate the innovative impact of KIBS on manufacturing as a proper causal relationship.

3 Methodology

In order to address the aforementioned research question, we follow an extended input-output based methodology, which is focused on the notion of “subsystem” in production, and on the compact representation of it represented by that of a “vertically integrated sector”.⁷⁸ In brief, this can be defined as the set of all the economic activities directly and indirectly required to satisfy the final demand of each economic sector. Unlike the standard generic sector, j , which accounts for the economic activities that its firms carry out to contribute directly to their final demand, its vertically integrated equivalent also retain those activities of j which are necessary for obtaining their production inputs, and the production inputs of these inputs, and so and so forth in subsequent production rounds: in brief, those activities of j that contribute to its final demand indirectly, that is through other intermediate sectors.

Following the seminal work by Momigliano and Siniscalco (1982), the generic vertically integrated sector j can be represented by column j of the following $(n \times n)$ matrix (with n equals to the number of economic sectors of an economy):

$$\mathbf{B} = \hat{\mathbf{q}}(\mathbf{I} - \mathbf{A})^{-1} \hat{\mathbf{y}} \quad (1)$$

In Eq.(1), $\hat{\mathbf{q}}$ is the diagonalised vector of gross production, \mathbf{A} is the matrix of input-output coefficients, and $\hat{\mathbf{y}} \hat{\mathbf{y}} \hat{\mathbf{y}}$ is the diagonalised vector of total final demand. Given the conventional meaning of the Leontief inverse, $(\mathbf{I} - \mathbf{A})^{-1}$ (for which see Miller and Blair, 2009), each generic element, b_{ij} , indicates the total contribution, that is, direct and indirect, of sector i to the final demand of sector j .

The application of this perspective to the analysis of intersectoral embodied innovation/knowledge flows is then straightforward. Taking the expenditure in Research and Development (R&D) of sector j (r_j) as an input kind of proxy of the new knowledge generated by its firms (a standard assumption in innovation studies), the following $(n \times n)$ focal matrix, \mathbf{R} , can be obtained:

$$\mathbf{R} = \hat{\mathbf{r}}\mathbf{B} \quad (2)$$

where $\hat{\mathbf{r}}$ is the diagonal vector of sectoral R&D expenditure.

Under a number of hypotheses (for which see Leoncini and Montresor, 2003), the generic element of \mathbf{R} , r_{ij} , measures the amount of sector i 's R&D knowledge that gets embodied in the intermediate commodities required to i by sector j , both directly and indirectly (that is, in subsequent production rounds), in order to satisfy one unit of its final demand.⁷⁹ In other words, the correspondent knowledge flow, from i to j , takes into account that the former sector can contribute to the latter also being the intermediate input of a third generic sector, z , which is in turn an input for sector j . Furthermore, the knowledge flow which reaches sector j from sector i , is made possible also by the innovative knowledge that the latter has got from the former, again directly and indirectly.

In synthesis, the matrix \mathbf{R} appears suitable to deal with the complex relationships that link sectors to each other. In our case, \mathbf{R} allow us to retain that KIBS typically provide knowledge inputs that industries absorb, combine and transform into innovative products and processes, through multiple intersectoral rounds. Furthermore, it also accounts for the fact that the knowledge of the client manufacturing sectors is an essential knowledge input for KIBS' innovation too. The relevant knowledge interaction is in fact a “chain-one”, rather than linear (Kline and Rosenberg, 1986), in which the occurrence of feed-back is a crucial aspect of innovation diffusion.

The use of matrix \mathbf{R} for the analysis of production-based flows of KIBS knowledge into manufacturing is quite straightforward. In the aggregate, for the generic industry (or better to say, subsystem), j , this is given by:

$$KIBS_j = \sum_{i=k}^s r_{ij} \quad (3)$$

where the sectors which go from k to s are the KIBS sectors out of the n industries of the relevant economic system. In other words, $KIBS_j$ is nothing but the row-sum of the relevant column j of \mathbf{R} , with respect to the $(s - k)$ number of KIBS

⁷⁸ On the genesis of these ideas, dating back to the work of Sraffa (1960) and Pasinetti (1973), and on their application to the analysis of structural change and outsourcing in particular, see Montresor and Vittucci (2007).

⁷⁹ Among these hypotheses, the temporal reference of the variables that enter in the definition of Eq.(2) is an important one. As our time-neutral notation suggests, we hereby assume an instantaneous kind of diffusion process, in which the R&D expenditure of sector i at time t , gets totally embodied in (that is, it is proportional to) its input requirements by sector j of the same year. While this could actually happen at most partially, a temporisation of these effects would remain subject to a great amount of ad-hocness (on this point, see Leoncini and Montresor, 2003).

sectors. Of course, each of these addenda (from r_{kj} to r_{sj}) is, in turn, the production-based flow which pertain to each and every of the KIBS sectors.⁸⁰

4 Application

4.1 Empirical context

The issue at stake in the paper is investigated with respect to the four largest economies of the European Union (EU), that is: France, Germany, Italy and the UK. The choice is motivated by the relevance of the vertical integration of KIBS into manufacturing that previous studies have found in these four countries over the last two decades, and by their heterogeneity in the same respect. As shown by Ciriaci and Palma (2012), when the vertical integration of Eq.(1) is measured in terms of employment (that is, by substituting \mathbf{r} with a sectoral vector of labour, \mathbf{l} , in Eq.(2)), in France and Germany KIBS show an increasing degree of vertical integration into manufacturing from 1995 to 2005: a trend which is the more evident in the manufacturing subsystems of a higher technological intensity, though with differences between the two countries.⁸¹ In the UK, instead, the vertical integration of KIBS into manufacturing in the same period shows an inverted U-shape over time, with a turning point of its initial increasing trend in the early 2000s, at the take-off of the “service-based” economy.⁸² Finally, while still with an increasing trend, KIBS appear relatively less integrated in Italy than elsewhere, pointing to the influence of the specialisation patterns of one economy (notably low-tech in Italy) on the integrated role of KIBS.⁸³

Our empirical analysis of these four countries⁸⁴ refers to the same period of Ciriaci and Palma (2012) that is 1995-2005. More precisely, due to the discontinuous temporal availability of input-output data we refer, as they do, to two sub-periods of this temporal window: from the mid-90s (1995 and/or years around that) to the early-00s (2000 and/or years around that); from the early-00s to the mid-00s (2005 and/or years around that).

4.2 Econometric strategy and variables

In order to estimate the innovation impact of the vertical integration of KIBS into manufacturing, we use a standard “knowledge (log-) production-function” (Griliches, 1979) at the sub-system level. In so doing, we make the innovative knowledge obtained by each generic manufacturing sector j ($Inno_j$) depend on the flow of KIBS embodied knowledge ($KIBS_j$) – as from Eq.(3) – and on a set of theoretically consistent variables – i.e. its own knowledge (RD), physical (K), and human (L) capital – as follows:

$$\ln(Inno_{j,t+1}) = \alpha_0 + \alpha_1 \ln(KIBS_{j,t}) + \alpha_2 \ln(RD_{j,t}) + \alpha_4 \ln(K_{j,t}) + \alpha_5 \ln(L_{j,t}) + \omega_j + \varepsilon_j \quad (4)$$

where ω_j is the country/sector fixed effect, ε_j is an error term with standard properties, and the temporal notation (t) points to a lag between dependent and independent variables.

As far as the *dependent variable* is concerned, among the several available proxies of innovative output, we have opted to use patent applications and to resort to a proper counting of them. While we are aware of the still vivid debate about the *pros* and *cons* of using patent data as reliable innovation indicators (Watanabe et al., 2001)⁸⁵, and of the several and

⁸⁰ An important issue in building up these indicators is making them free from scale effects across sectors. Different relativisation procedures have been put forward for that in the literature, which all suffer from some kind of bias (for a discussion, see Montresor and Vittucci Marzetti, 2009). As we will see in the next section, the econometric strategy that we will follow enable us to control for size effects in R&D.

⁸¹ In France, for example, in 2005 KIBS accounted for 12.5% and 15% of the total employment needed to satisfy the final demand for low and medium/low-tech subsystems’ products, respectively, while the correspondent shares in 1995 were of 10.7% and 10.5%. The 2005 shares are significantly higher in the case of medium/high-tech (20.3%) and high-tech manufacturing subsystems (19.9%), whose values in 1995 were of 17.4% and 18.7%, respectively. In Germany, the increase of the same degree of vertical integration over the same period is even more accelerated – possibly in response to the policy support of services started in the late 80s (Windrum and Tomlinson, 1999). However, the same trend is more concentrated in the medium and high-tech manufacturing subsystems than in France.

⁸² The results for the UK are in line with other empirical studies sharing the same subsystem approach used in this study (Montresor and Vittucci Marzetti, 2010 and 2007).

⁸³ The previous picture is generally consistent with that found by Barker (2007), looking at the “simple” share of business service inputs of total intermediate inputs in manufacturing. France (13.9% in 1995), Germany (10.8% in 1995), and the UK (10.7% in 1998) stay apart from Italy (4.1% in 1992) and from other countries with a lower weight of KIBS in manufacturing (e.g., Denmark, 5% in 1997; Finland, 6.6% in 1995; Greece, 5.4% in 1995; Spain, 4.9% in 1995).

⁸⁴ Although this is a limited set of countries, their choice has been also inspired by the attempt at keeping a relatively high number of sectors when the different datasets that are needed for the application are merged. For the majority of the smaller European counties, this combination actually entails a substantial decay of sectors for which data are not available. Also the choice of the temporal span of the application has been inspired by the attempt at building up a panel with a satisfactory level of sectoral disaggregation.

⁸⁵ A debate that dates back at least to the famous Griliches’ (1990, p. 1669) concern.

interrelated options of patent-based proxies (Guellec and van Pottelsberghe de la Potterie, 2000), our focus on patent applications has two main motivations. Firstly, we wanted a proxy which could be retained logically and temporally close to the manufacturing use of the R&D-knowledge acquired from KIBS, rather than a more distant one (such as, for example, patent citations), possibly more volatile and affected by other antecedents than our focal one (e.g. local and international co-operation in the invention process) (Jaffe and Trajtenberg, 2002). In brief, we argue and expect that the production-based kind of KIBS knowledge flows we are investigating have a more direct effect on the client firms propensity to patent than of taking stock of the application (Brouwer and Kleinknecht, 1999). Secondly, and relatedly, the choice is also inspired by the evidence about the role of patent applications (possibly more than patent granted) as a key differentiating element of technological regimes and sectoral systems of innovation (Breschi et al., 2000; Malerba and Orsenigo, 1997) that is of our level of analysis.

On this basis, *Inno* is proxied with the (log of the) number of patent applications (*PAT*) available in the Worldwide Patent Statistical Database (PATSTAT) of the European Patent Office (EPO). Following conventional choices in the use of patents as innovative proxy at the micro-level (Acs and Audretsch, 1989), they have been obtained referring to the priority-date patents applied worldwide by inventors of the four relevant nationalities in 43 manufacturing sectors following NACE Rev. 1 classification (Tab. A1).⁸⁶

An important aspect in the patent measurement of *Inno* is its temporal specification. On the one hand, counted patent applications are subject to quite erratic year-by-year variations, which need to be smoothed for the sake of their econometric analysis (Wang et al., 1998). On the other hand, in spite of the arguments about their inventive-input nature, a substantial impact of R&D (and R&D spillovers) on patent applications can be expected only with a temporal delay, during which the acquired knowledge gets processed, absorbed and codified into a patent document: as much as a delay has been found for the impact of patent applications on changes of economic performance (Ernst, 2001). In order to account for these issues, we have considered the (log of the) average number of applications (*PATAVE_j*) in the three years after ($t+1$ in Eq.(4)) that of the retained KIBS flows and of the measurement of the other regressors (t in Eq.(4)). This means that we have used (i) the average number of patent applications during the period 1995-1997, with respect to KIBS vertical integration in 1995; (ii) the average number of patent applications during the period 2000-2002, with respect to KIBS vertical integration in 2000; and (iii) the average number of patent applications during the period 2005-2007, with respect to KIBS vertical integration in 2005.⁸⁷ The correspondence between Nace (Rev1) patent data, our key independent variable (*KIBS_j*) and the others variables in Eq.(4), whose sectoral level of disaggregation follows the ISIC Rev. 1 classification (see Table A2 in the appendix) and which are described in the following, has been obtained following the NACE-ISIC concordance table developed by the United Nations (UN). The sectoral disaggregation adopted in the econometric analysis (which includes 18 manufacturing sectors and 7 service sectors) is reported in the appendix (Table A3).

As far as the independent variables are concerned, the focal regressor, *KIBS_{j,t}*, has been obtained following Eq.(2) and by combining two sets of data: (i) the OECD STAN Input-Output dataset, from which we have drawn the matrices of total intermediate production flows (at current prices) for the 37 sectors of the ISIC Rev. 1 classification, for the three years covered by our analysis, 1995, 2000 and 2005; and (ii) the OECD Analytical BERD (ANBERD) dataset, from which we have collected data on R&D expenditures (PPP dollars at current prices) for the same years and 37 sectors of the ISIC Rev. 1 classification.⁸⁸ *KIBS_{j,t}* has been computed firstly in aggregate terms.⁸⁹ That is, for each sector (column) j of the 18 manufacturing ones we have been able to include, *KIBS_{j,t}* is the sum by row of the following sectors of **R**: Computer and related activities (*KIBS-COMP*, corresponding to sector C72 of the ISIC Rev. 1 classification), Research and Development services (*KIBS-RD*, sector C73) and Other business activities (*KIBS-BUS*, sector C74).⁹⁰ Secondly, in order to account for the diversity of KIBS sectors, we have also considered their corresponding rows of **R** for the aforementioned 18 manufacturing sectors separately - *KIBS-COMP_{j,t}*, *KIBS-RD_{j,t}*, and *KIBS-BUS_{j,t}* - and inserted them - alternatively to *KIBS_{j,t}* - in Eq.(4).

Coming to the other regressors of Eq.(4), the own knowledge capital of sector j has been proxied by referring to two kinds of R&D expenditure at time t . As an indicator of the innovation opportunities sector j can benefit from in a disembodied way, we have built up the R&D intensity of sector j at time t , *RD_INT_{j,t}*, as (the log of) the ratio of total R&D expenditure over total employment (source: OECD-STAN). Furthermore, we have distinguished from it the R&D

⁸⁶ Standard fractional-counting procedures have been used in the cases of patents with multiple co-inventors of different nationalities.

⁸⁷ A longer, forward temporal span would have suffered from the substantial decay, which is inevitably registered in the number of patent applications from the year 2007 onwards.

⁸⁸ In those few cases in which R&D data were available only at the next more aggregated level than the disaggregated one for the IO data, they have been artificially disaggregated in proportion of the correspondent value added. R&D sectoral data at current prices were the only available ones for the time period under study. However we believe that this does not represent a drawback for the analysis, as we controlled price variations while taking advantage of actual sectoral relevance of innovative activities through time in the estimation.

⁸⁹ As we have said, given the bias introduced by any relativisation procedure for **R**, the *KIBS* variables are built up with respect to the absolute values of the same matrix, leaving to the econometric model the control for size effects.

⁹⁰ Although sometimes also classified as KIBS, Post and Telecommunications (C64), and Finance and Insurance (C65T67) have not been considered in our analysis because of their lower impact on the kind of technological innovations we are considering, and because of the gaps in the available data. The remaining sectors out of the 37 are classified as: Primary sectors (P), Public Utilities (PU), Construction (C), Market services (MS), and Non-Market services (NM).

available in sector j at time t in an embodied way, as the result of the production flows occurring among firms belonging to sector j itself, by referring to the correspondent cell of the main diagonal of matrix \mathbf{R} in Eq.(2), $RD_INTRA_{j,t}$.

Finally, the physical and human capital inputs of the production function (Eq.(4)) have been proxied with, respectively, the fixed-capital intensity of sector j at time t ($K-INT_{j,t}$) obtained by relating its fixed investments to its total employment (source: OECD-STAN), and its total employment at time t ($L_{j,t}$) (source: OECD STAN).

The different data sources used for building our variables are summarised in Table A4.

5 Results

5.1 Some descriptive statistics

Table 1 reports the main descriptive statistics of the dependent and independent variables described in the previous section for the overall sample and by country. As preliminary insight on our research hypothesis, Figure 1 displays the relationship between the dependent variable ($PATAVE$) and our key explanatory variable ($KIBS$), by showing both the data scatterplot and the ordinary least-squares fitted line. As shown by the figure, there are evident traces of a positive relationship among the two.

Table 1. Descriptive statistics of the variables.

Variable	Overall simple				
	Obs	Mean	Std. Dev.	Min	Max
<i>PATAVE</i>	216	5.2526	1.4535	1.7918	8.6595
<i>KIBS</i>	216	16.3206	1.0132	13.4786	18.6968
<i>KIBS-COMP</i>	216	14.9538	1.2734	11.4825	17.8369
<i>KIBS-RD</i>	216	11.0073	6.5062	0.0000	17.8971
<i>KIBS-BUS</i>	216	13.9992	2.0366	7.6014	17.5350
<i>RD-INT</i>	216	5.8011	3.9644	0.0000	10.4341
<i>CAP_INT</i>	214	8.9031	0.8025	6.2742	11.7686
<i>EMP</i>	216	12.2077	0.9325	9.0775	13.9631
<i>RD_INTRA</i>	216	5.2022	1.9119	0.0000	9.4448
<i>France</i>					
<i>PATAVE</i>	54	5.30048	1.313537	2.224623	7.317763
<i>KIBS</i>	54	16.29423	1.007847	13.47864	18.08009
<i>KIBS-COMP</i>	54	15.20832	1.08369	12.03172	17.32813
<i>KIBS-RD</i>	54	0.000000	0.000000	0.000000	0.000000
<i>KIBS-BUS</i>	54	15.04415	1.10969	11.98917	17.25564
<i>RD-INT</i>	54	6.850044	3.650889	0.000000	10.43414
<i>CAP_INT</i>	53	9.049161	0.740515	7.267001	11.76856
<i>EMP</i>	54	11.93967	0.8226936	9.077495	13.24871
<i>RD_INTRA</i>	54	5.526059	1.739273	1.200868	8.276429
<i>Germany</i>					
<i>PATAVE</i>	54	6.209465	1.423548	3.681779	8.659453
<i>KIBS</i>	54	16.41957	1.072082	14.19395	18.6968
<i>KIBS-COMP</i>	54	14.94366	1.501709	11.54249	17.83689
<i>KIBS-RD</i>	54	13.93618	1.797612	10.16589	17.89706
<i>KIBS-BUS</i>	54	15.58331	0.9673464	13.66119	17.53499
<i>RD-INT</i>	54	6.437595	3.617021	0.000000	10.20363
<i>CAP_INT</i>	54	8.90837	0.6369268	7.94189	11.09874
<i>EMP</i>	54	12.65352	0.9999713	9.903538	13.96307
<i>RD_INTRA</i>	54	6.024803	1.788242	2.306975	9.444845

Table 1. cont'd.

	<i>Italy</i>				
<i>PATAVE</i>	54	4.695305	1.261626	1.941185	7.099398
<i>KIBS</i>	54	16.09687	1.077924	13.64116	18.22363
<i>KIBS-COMP</i>	54	14.14088	1.125996	11.48248	16.55144
<i>KIBS-RD</i>	54	15.53913	1.127824	13.19002	17.60265
<i>KIBS-BUS</i>	54	13.77176	1.189856	11.2385	16.12139
<i>RD-INT</i>	54	4.456423	4.078364	0.000000	9.615872
	<i>United Kingdom</i>				
<i>CAP_INT</i>	54	9.35855	0.6144005	8.080791	11.21478
<i>EMP</i>	54	12.16308	0.9765148	9.857496	13.82744
<i>RD_INTRA</i>	54	4.294164	1.701016	0.903408	7.052602
<i>PATAVE</i>	54	4.804996	1.330592	1.791759	7.226823
<i>KIBS</i>	54	16.47178	0.8672458	14.16264	17.99246
<i>KIBS-COMP</i>	54	15.52228	0.9008845	13.19189	16.97217
<i>KIBS-RD</i>	54	14.55392	1.134622	11.54249	16.52529
<i>KIBS-BUS</i>	54	11.5975	1.908878	7.601402	15.50819
<i>RD-INT</i>	54	5.460146	4.149416	0.000000	10.34177
<i>K_INT</i>	53	8.287448	0.8171986	6.274218	10.39303
<i>EMP</i>	54	12.07437	0.775212	10.0993	13.15025
<i>RD_INTRA</i>	54	4.963853	2.004291	0.000000	8.460532

Data are expressed in natural log.

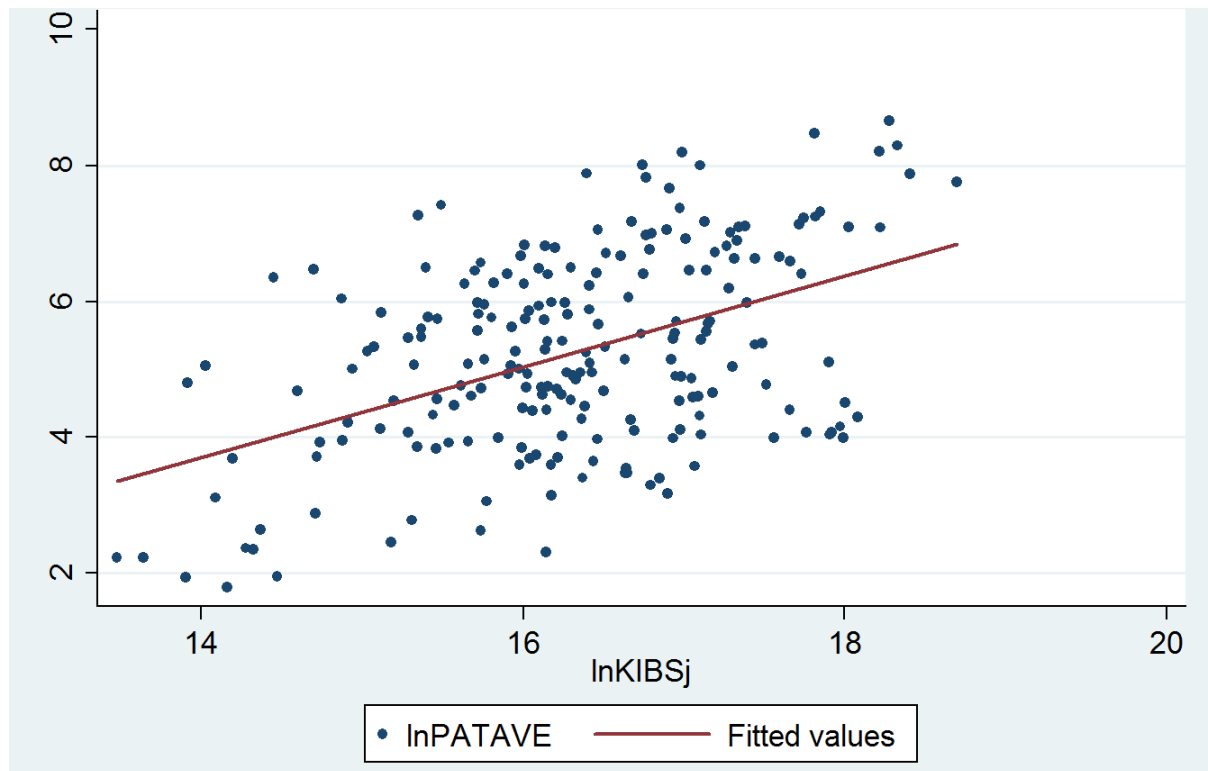


Figure 1. Scatterplot and OLS fitted line.

As shown in Table 2, the pair-wise correlation among the adopted regressors is in general low. In particular, the KIBS variables are not significantly correlated with the R&D based ones, supporting our theoretical conjecture that the innovation impact of the former is not (necessarily) due to an induced increased of the latter. A notable exception is

represented by the correlation between *RD_INT* and *RD_INTRA*, which appear nearly collinear between them. Given that the largest sector contributions to each sub-system are normally those of the correspondent sector – that is, sector *j* vs. sub-system *j* - this is not unexpected and suggests to us that one of the two from the estimates should be dropped. As our focus on KIBS relies on the embodiment hypothesis, for the sake of consistence we have opted for retaining *RD_INTRA*. Finally, let us observe that, looking beyond pair-wise correlations, the variance inflation factors (VIF)⁹¹ are low, as it is symptomatic in the lack of multicollinearity.

Table 2. Pairwise correlation coefficients.

	<i>PATAVE</i>	<i>KIBS</i>	<i>KIBS-COMP</i>	<i>KIBS-RD</i>	<i>KIBS-BUS</i>	<i>RD-INT</i>	<i>RD-INTRA</i>	<i>K_INT</i>	<i>L</i>
<i>PATAVE</i>	1								
<i>KIBS</i>	0.4656*	1							
<i>KIBS-COMP</i>	0.3641*	0.8767*	1						
<i>KIBS-RD</i>	0.0304	0.1382*	-0.0179	1					
<i>KIBS-BUS</i>	0.4347*	0.4728*	0.3042*	-0.2410*	1				
<i>RD-INT</i>	0.5793*	0.2006*	0.2251	-0.1247*	0.1354*	1			
<i>RD-INTRA</i>	0.7894*	0.6086*	0.5330*	-0.0357	0.4224*	0.7693*	1		
<i>K-INT</i>	0.0838*	-0.0342	-0.1031*	-0.073*	0.2099*	0.3487*	0.1723*	1	
<i>L</i>	0.2430*	0.5501*	0.3518*	0.2195*	0.4363*	-0.3627*	0.1334*	-0.4005*	1

*Indicates correlation coefficients significant at least at the 5% level.

Before presenting and commenting the results of the econometric analysis, it is interesting to note that the key explanatory variable of our study– that is, KIBS expenditure in R&D acquired by manufacturing sectors through vertical integration – has evolved differently over the retained period in the four countries at word (Figure 2).

⁹¹ Available from the authors upon request.

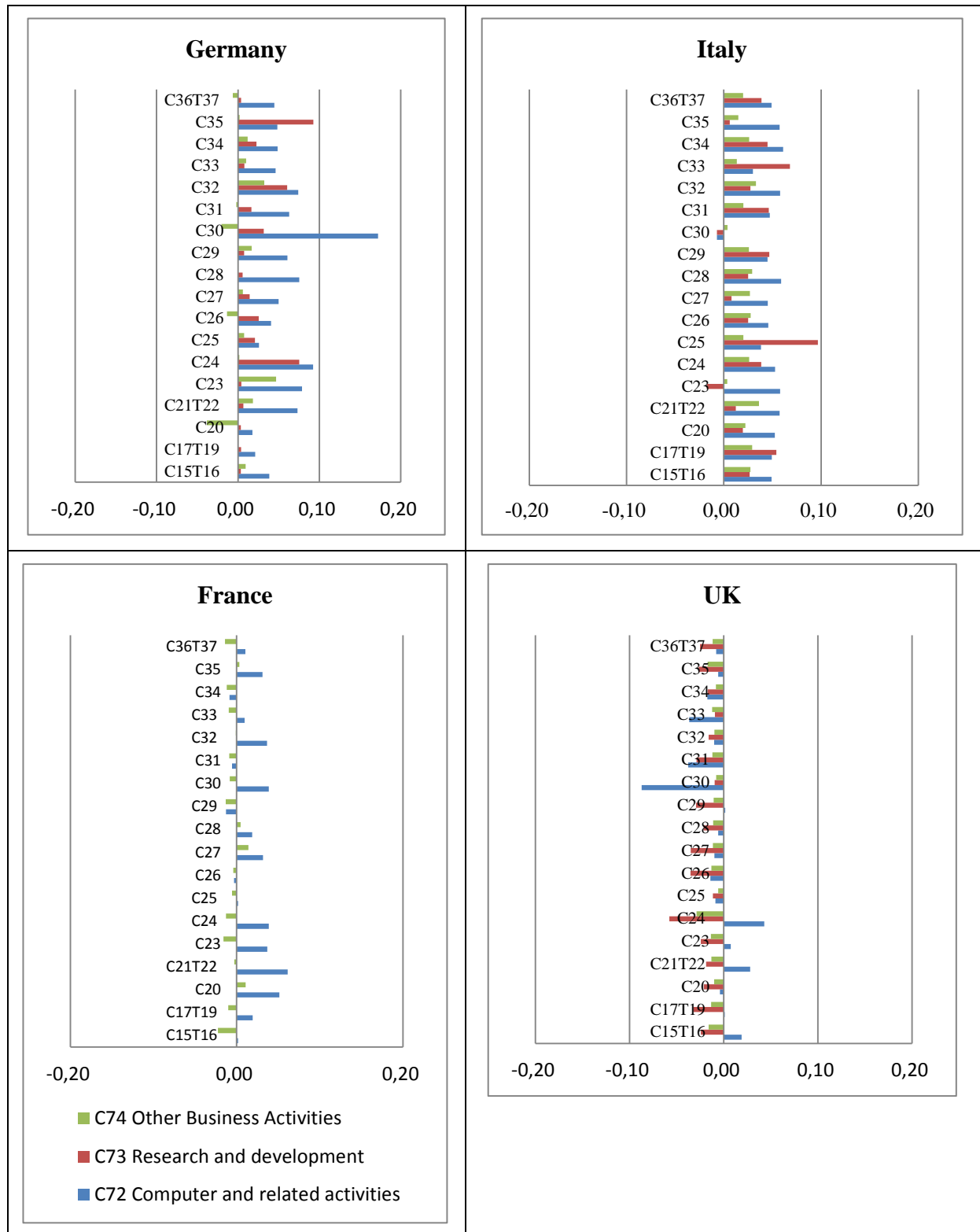


Figure 2. KIBS' R&D acquisitions by manufacturing sectors: 1995–2005
(% change of total intersectoral acquisitions).

On the one hand, although with some exceptions, in Italy and Germany nearly all the 18 considered manufacturing sectors increased the percentage points of their total embodied R&D acquired from KIBS in-between 1995 and 2005. More in particular, in Italy this increase appears relatively more homogenous across the three kinds of KIBS considered than in Germany. Here, the vertical integration of KIBS innovative knowledge into manufacturing has mainly concerned those produced by computer and related activities, especially with respect to technologically close sectors (e.g. sector C30, office, accounting and computing machinery). On the other hand, France and the UK show a completely different picture, with a decreasing reliance of manufacturing on KIBS-embodied R&D over the decade.

While in France this is limited to the percentage weight of other business activities – with that of R&D services remaining basically unaltered and that of computer and related activities generally increasing over time – in the UK it is indeed a general (with some few exceptions for computer and related activities) pattern. Thinking of the increasing weight that KIBS have gained in these economic systems over time, this last result might appear unexpected. However, in interpreting it, one should consider that the kind of knowledge diffusion we are considering is that of the production-based approach (see Section 2.1), which attributes a pivotal role to the underlying production transactions. In this last respect, the “generic” (e.g. in terms of employment) vertical integration of KIBS in manufacturing that previous studies have detected for the countries at stake over the focal period (see Section 4.1) is an important piece of information, and it is consistent with our results (Ciriaci and Palma, 2012). For example, in the case of the UK, the registered decrease does not exclude KIBS having increased their contribution to manufacturing in a disembodied way, exploiting a degree of development of the relative knowledge-interfaces that in the UK is quite established. To be sure, a sort of substitution in the resort to the two channels can be put forward and would deserve further testing in future research.

For the time being, our analysis focuses instead on the relevance of embodied R&D flows for the innovative performance of manufacturing sectors, as it can be captured by their patent applications. In this last respect, Figure 3 shows again heterogeneity across the four countries in the retained period, when we look at the cumulated number of patent applications in the retained manufacturing sectors. Germany and Italy are extreme cases, among the four, with the highest and lowest numbers of patent applications in the 18 considered sectors, respectively: a result that appears quite interesting for our research hypothesis, when we think of the high and low degree, respectively, of vertical integration of KIBS into manufacturing in the two countries. Both in Germany and in Italy, the machinery sector (sector C29) appears the most innovative one, followed by chemicals (sector C24) at a certain distance and by a narrow club of high-tech sectors. On the other hand, the UK and France are somehow in-between in terms of (cumulated) number of patent applications and share the dominant role of chemicals over machinery in the same respect. Even when cumulated patents are considered, their temporal variations across the considered periods remain quite erratic, confirming their well-known noisy nature (Jaffe and Trajtenberg, 2002). Overall, however, in the majority of the sectors, they increase from the beginning to the end of period, passing through a slight decrease in the intermediate one.

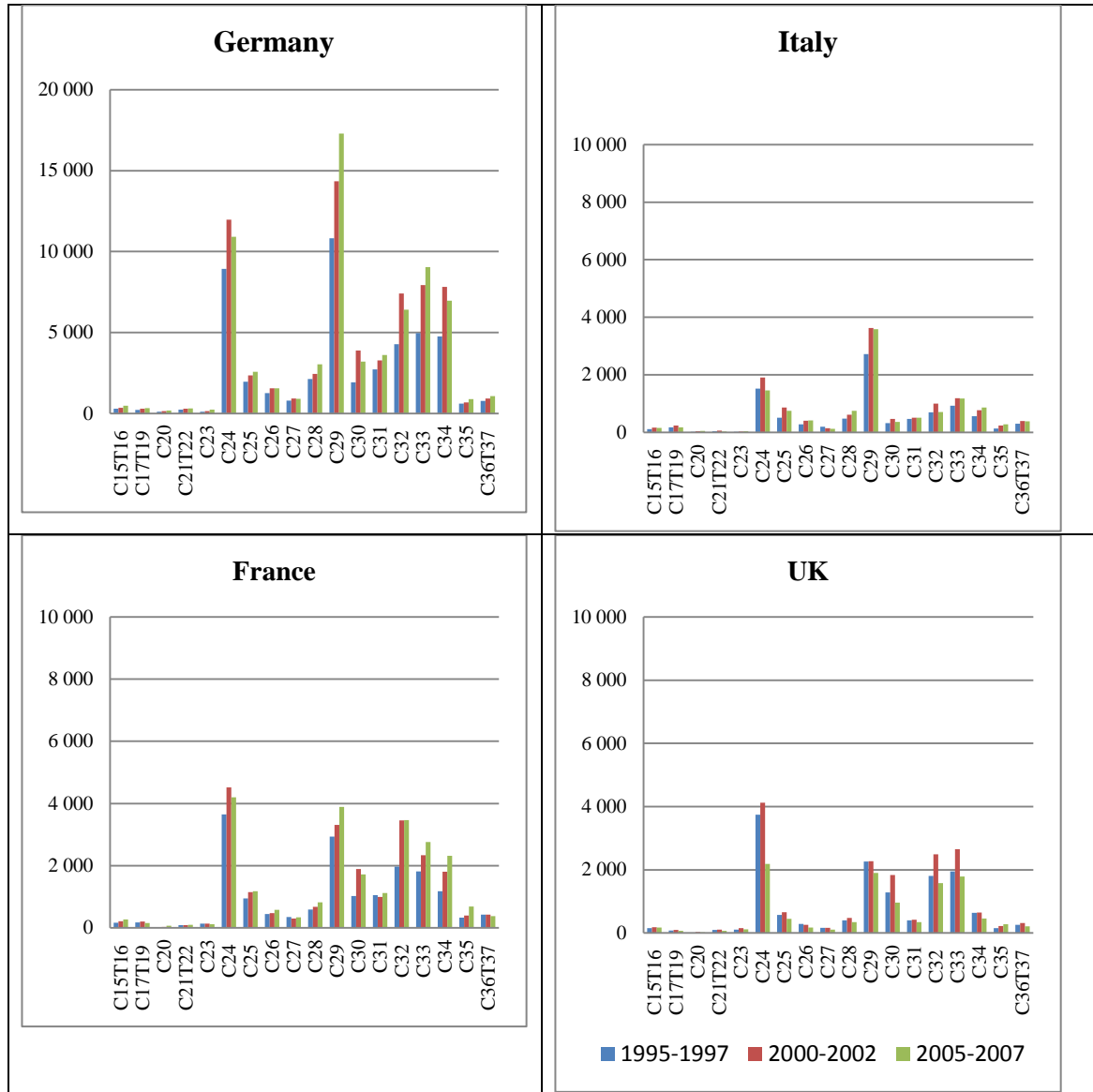


Figure 3. Cumulated number of patents in manufacturing: 1995–2005.

5.2 Econometric results

Before presenting the econometric results of the estimates of Eq.(4), it should be noted that the distribution of our dependent variable (*PATAVE*) is not substantially dissimilar from a normal one (see Figure A1). Accordingly, the resort to a probit or count model, of the kind usually adopted to estimate the knowledge production function at micro-level, does not appear necessary in our case.

A second important point concerns the possible endogeneity from which our focal regressor, *KIBS_j*, could suffer because of the complex relationships that link KIBS and manufacturing in the production-based transmission of knowledge (see Section 2.1), and that could persist even in the presence of a lag in the assumed impact of the former on the latter.⁹² In order to account for this issue, we have used as an instrument for *KIBS_j* the degree of vertical integration that KIBS reveal in sector *j* in terms of employment, following the relative estimator, *L_KIBS_j*, calculated by Ciriaci and Palma (2012). As we said in Section 4.1, this can be obtained by substituting *r* with a sectoral vector of labour, *l*, in Eq.(2). From a theoretical point of view, this appears an appropriate choice. On the one hand, as we have actually found in commenting the descriptive results of the previous section, manufacturing subsystems whose employed labour is largely accounted by its vertically integrated KIBS have higher chances to acquire larger shares of production-based KIBS (R&D) knowledge. On the other hand, as recent studies in innovation economics and industrial organization have shown (e.g. Mazzanti et al., 2007), a significant impact of the degree of vertical disintegration (i.e. as a consequence of outsourcing) on innovation could vanish in front of a number of conflictual forces. More in general, being the vertical

⁹² For example, *PATAVE* (1995-1997) may affect the KIBS knowledge flow in 2000. Then, the KIBS knowledge flow in 2000 affects *PATAVE* (2000-2002) in turn. We thank a reviewer for having raised this point.

integration in terms of labour a structural characteristic of an economic system, in our context it could be considered as exogenous and uncorrelated with the error term. Of course, this theoretical conjecture about our proposed instrument will have to be tested in the following.

In search for a suitable model for estimating Eq.(4), looking at the structure of our panel data, we first conducted a Breusch-Pagan Lagrange Multiplier (LM) test. The test rejects the null hypothesis that OLS residuals do not contain individual specific error components, thus confirming the presence of random effects. However, given that the simple presence of random effects does not imply that the relative model is more efficient than a fixed effect one, we have also run a Hausman test (Hahn *et al.*, 2011) to address the choice between the two (Table 3).⁹³ The results of the test suggest that the fixed effect estimation is the way forward, as we reject the null hypothesis of zero correlation between the regressors and the error term.⁹⁴

Table 3. Hausman test results. Ho: non-syst. difference in coefficients.

	(b) fixed	(B) .	(b-B) Difference
<i>KIBS</i>	0.1908395	0.1599169	0.0309226
<i>RD_INTRA</i>	-0.0320519	0.2324218	-0.2644737
<i>K_INT</i>	-0.1290995	-0.0620209	-0.0670786
<i>L</i>	-0.0283704	0.0754647	-0.1038351
<i>D_time1</i>	-0.1052946	-0.0724862	-0.0328083
<i>D_time2</i>	0.0495089	0.0582831	-0.0087742
chi2(6) = (b-B)'[(V _b -V _B) ⁻¹](b-B)= 140.96			
Prob>chi2 = 0.0000			

Table 4 reports the results of our estimates in a step-wise fashion. In particular, columns from (i) to (iv) report the estimates of the model obtained inserting the regressors sequentially; column (v) reports the robust fixed effect estimates obtained when we consider the R&D acquired by manufacturing sectors through their vertical integration with KIBS (*KIBS_j*); column (vi) those obtained fitting the panel data model with a two-stage least-squares within estimator (that is, instrumenting (IV) *KIBS_j* with *L_KIBS_j*).

Columns (vii) and (viii) report the estimates obtained, instead, when the three KIBS-sectors - and their vertical integration with the generic manufacturing sector *j* (*KIBS-RD_j*, *KIBS-COMP_j*, and *KIBS-BUS_j*) - are considered separately. In this regard, it is worth noting that the very low level of vertical integration of *KIBS-RD* for France (close to zero), prevented us from obtaining reliable estimates at this sectoral disaggregated level. Therefore, in trying to overcome this problem, in column (vii) we report the estimates of Eq.(4) obtained for this sectoral level of disaggregation excluding France, and in column (viii) the estimates obtained considering all the four countries, but leaving *KIBS-RD* out. For the sake of clarity, our reference estimates are those reported in column (v).

At the aggregated level (Model (v) and Model (vi)), our research hypothesis is confirmed: our key variable is significant and enters the equation with the expected sign in both models. However, comparing the IV results with those in column (i) the coefficient on the endogenous variable is significant at a lower confidence interval (IV standard errors are larger)⁹⁵. Given the loss of efficiency observed, we have performed a Hausman test to detect systematic differences between the OLS and IV estimates, whose results lead us to accept the null hypothesis of not systematically different coefficients (Table 5).

In general terms, our results show that the larger the R&D that manufacturing sectors acquire through the integration with KIBS, the higher their innovative performance. In particular, a one-percent increase in the R&D that manufacturing sectors acquire through the vertical integration with the whole of KIBS at time *t* lead to a 0.19% increase in average patenting of the following three years. In other words, the flows of R&D coming from KIBS and used by the manufacturing subsystems to satisfy their final demand positively affects the sector ability to create new knowledge. This result is in line with the theoretical framework reviewed in Section 2, emphasising the manifold innovative role that KIBS play in an economic system. In spite of the structural differences we have detected among the four countries, KIBS appear in all of them an innovation effective carrier of embodied R&D towards manufacturing. In addition, it is interesting to notice that, when KIBS-embodied R&D is plugged into the knowledge production function, *RD_INTRA* is

⁹³ Let us remember that, unlike the fixed effect model, which assumes that individual heterogeneity can be captured by the intercept term, the random one identifies it as a part of the error term. The advantage of the fixed effect model is that the intercepts can be correlated with the regressors, allowing for a limited form of endogeneity. On the other hand, the advantage of the random effect model is that it yields estimates for all the coefficients. Accordingly marginal effects, even those of time-invariant regressors, can be estimated.

⁹⁴ As a rule of thumb, if both estimates are similar, we can use a random effects estimator, whereas if they differ the fixed effects estimator is preferred.

⁹⁵ Regarding the instrument chosen results from the first stage regression have corroborated *L_KIBS_j* as a relevant instrument.

not significant. This result suggests that, in the considered countries, the only kind of “embodied” R&D that allows manufacturing sectors to obtain commercially exploitable inventions is that invested by specialist knowledge producers and acquired from them through economic transactions related to the production processes of the recipient sector. On the contrary, as suggested by previous studies (e.g. Marengo and Sterlacchini, 1990), intra-sectoral embodied R&D flows can be deemed inputs of incremental/process innovations that usually do not find a patent outcome. Finally, attention deserves the significant negative sign that K_INT assumes in the “augmented” knowledge production function that we consider. A one-percent increase in manufacturing capital intensity at time t decreases manufacturing average patenting of the following two years by 0.13%. Apparently, by “deepening” their physical capital the manufacturing sectors at word decrease, rather than increasing, their invention capacity. Although apparently counter-intuitive, this interpretation is consistent with the findings obtained by other studies on the decreasing innovation returns that equipment investments face with the increase of the industrialisation level of the investing sectors/countries (e.g. De Long and Summers, 1991; Dullek and Foster, 2008). To be sure, in our case it seems that the switch from industrialisation to tertiarisation could have even made these returns negative (Montresor and Vittucci Merzetti, 2011).

The disaggregated analysis of the relationship at stake (Models (iii) and (iv)) reveals some interesting results about the contribution of specific KIBS sectors to manufacturing patenting activity, but should be interpreted carefully given the biased introduced by the aforementioned ad-hoc exclusions. When $KIBS_RD$ are retained along with the other two KIBS – that is, by focusing on the UK, Germany and Italy (Model (iii)) – what emerges is an remarkable external variation of the linear innovation mode: the only KIBS whose R&D incorporation seems to make manufacturing sectors more innovative in Germany, Italy and the UK are those offering R&D services as such. On the contrary, in these three countries the knowledge that manufacturing sectors accrue by interacting in the production realm with less innovation-dedicated services – that is, business services and ICT – does not significantly help with that. Taking into account the results on RD_INTRA (and on RD_INT in alternative specifications, available from the authors on request), it seems that in the countries at word, providing it occurs within the same sub-system (on which, see Montresor and Vittucci Marzetti, 2007), the externalisation of R&D from manufacturing to services appears, from an innovation point of view, a viable strategy.

Finally, when we impose an *ad-hoc* misspecification on the model by leaving $KIBS_RD$ out but considering all four countries, the other two KIBS regain a significant role as innovation predictors for manufacturing. In spite of the possible bias emerging from variables omission, it is interesting to note that the contributions of $KIBS_COMP$ and $KIBS_BUS$ are significantly different between them,⁹⁶ confirming the inner heterogeneity that KIBS have been found to have in the extant literature (see, for example, Consoli and Elche-Hortelano, 2010; Doloreux and Shearmur, 2010). In particular, the impact of the embodied R&D acquired from $KIBS_COMP$ is higher than that from $KIBS_BUS$: a one unit increase in the flow of vertical integrated R&D at time t increases average patenting by 0.07 and 0.05, respectively, in the following two years. Thinking of the typical embodiment mechanism that the complementarity between software and hardware realises, and the impact that this complementarity has been found to have on the relationship between manufacturing and services (Stanback, 1979; 1981), this result is not unexpected. Of course, this does not want to underscore the pivotal role of the services that business consultants (sectors) provide to manufacturing. However, their innovation contribution could be expected to be higher when the transmission of their knowledge is disembodied, rather than embodied as in the focus of this paper.

Table 4. Estimates results: Dependent variable $PATAVE$.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)
	Within estimator	Within estimator	Within estimator	Within estimator	Within estimator	Two-stage within estimator	Within estimator (France excluded)	Within estimator (KIBS-RD excluded)
KIBS	0.273*** (0.0292)	0.275*** (0.0309)	0.278*** (0.0304)	0.278*** (0.0299)	0.191*** (0.0387)	0.368* (0.224)		
KIBS-COMP							-0.0393 (0.0498)	0.0725*** (0.0191)
KIBS-RD							0.250*** (0.0449)	
KIBS-BUS							0.0204 (0.0163)	0.0514*** (0.0167)
RD-INTRA		-0.00612 (0.0545)	-0.0177 (0.0492)	-0.0170 (0.0481)	-0.0321 (0.0388)	-0.0638 (0.0644)	-0.0364 (0.0423)	-0.0355 (0.0399)
K-INT			-0.0918** (0.0459)	-0.129** (0.0569)	-0.129** (0.0536)	-0.154** (0.0605)	-0.165** (0.0647)	-0.138** (0.0581)

⁹⁶ An F-test has been used to test the null hypothesis that the difference between the KIBS' coefficients was equal to zero.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)
	Within estimator	Within estimator	Within estimator	Within estimator	Within estimator	Two-stage within estimator	Within estimator (France excluded)	Within estimator (KIBS-RD excluded)
L				-0.139 (0.151)	-0.0284 (0.193)	-0.0254 (0.320)	-0.194 (0.162)	-0.0684 (0.172)
D_time1					-0.105** (0.0514)	0.0183 (0.162)	-0.212*** (0.0476)	-0.152*** (0.0481)
D_time2					0.0495 (0.0402)	0.0841 (0.0571)	-0.0585 (0.0524)	0.0597 (0.0401)
Constant	0.794 (0.477)	0.799 (0.486)	1.635** (0.635)	3.641 (2.315)	3.820 (2.621)	4.010* (2.053)	6.810*** (2.416)	5.728** (2.418)
Observations	216	216	214	214	214	214	160	214
R-squared	0.337	0.337	0.364	0.370	0.443		0.508	0.496
Number of i_panel	72	72	72	72	72	72	54	72

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 5. Hausman test results. Ho: difference in coefficients not systematic.

	(b) endogenous	(B) .	(b-B) Difference
<i>KIBS</i>	0.3683226	0.1908395	0.1774831
<i>RD_aut</i>	-0.0637949	-0.0320519	-0.031743
<i>CAP_INT</i>	-0.1541514	-0.1290995	-0.0250518
<i>EMP</i>	-0.2535305	-0.2283704	-0.0251601
<i>D_time1</i>	0.0183497	-0.1052946	0.1236443
<i>D_time2</i>	0.0840956	0.0495089	0.0345867
chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)=	0.65		
Prob>chi2 =	0.9955		

6 Conclusions

The connection between KIBS and innovation is by far an established one. On this basis, important policy initiatives have been promoted - at both national and European level - to increase their weight in economic systems and to develop the market conditions for manufacturing firms to be able to exploit them.

In spite of all the existing evidences, however, the multiplicity of channels through which KIBS can contribute to innovation has not been fully explored yet. In particular, while the direct innovative role of KIBS is quite understood, its indirect one still deserves analysis. This is especially so for the extent to which the innovative efforts undertaken by KIBS – typically their R&D expenditures – get acquired by manufacturing sectors, through the direct and indirect production relationships that constitute their vertically integrated sectors, and finally increase their innovation performance. The pervasive diffusion of outsourcing strategies by manufacturing firms towards service providers makes this issue an extremely relevant one to be addressed.

The present paper contributes to this research need with a new empirical application that has three original elements. First of all, it tries to retain both direct and indirect production relationships between KIBS and manufacturing, by making use of the sub-system methodology. Secondly, it goes beyond the simple mapping of these relationships and directly addresses their actual innovation impact. Thirdly, in order to do that, it combines different data sources to obtain a panel in which causality relationships can be more accurately identified.

Although limited to four European countries, over the period 1995–2005 – both because of data availability and continuity with previous research – the results we have obtained are quite interesting and have a number of policy implications. First of all, embodied R&D flows acquired from KIBS actually make manufacturing sectors more innovative. In other words, the innovativeness of manufacturing sectors could also be increased by exploiting the

features of the so-called Schumpeter Mark III model and reinforcing the (production) interactive linkage between industry and services. Innovation policies to foster R&D cooperation and technology transfer between the two realms could have a role in that. However, our results also suggest that the increasingly extensive processes of vertical integration of services into manufacturing that are occurring in the aftermath of the outsourcing strategies of industrial firms (Montresor and Vittucci Marzetti, 2011) can have an important innovation impact too. The same is thus true for those policies that address the specialisation patterns of countries and/or regions and that in so doing bring about structural changes in their vertically integrated sub-systems.

More generally, our results support the innovative importance of the so-called “rent” kind of R&D spillovers, which occur irrespectively from the public good properties of innovative knowledge and are rather due to the different contractual power of the interactive partners and the market structure they operate in. In this last respect, industrial policies (e.g. competition ones) find an additional leverage through which they can complement R&D ones in increasing innovation in manufacturing. Indeed, while within-sector R&D needs proper financing, that acquired from KIBS just requires manufacturing firms to face the production and the transaction costs to undertake the underlying economic exchange.

An additional interesting result of our application is the confirmation of the fact that KIBS are different among them, also in their capacity of conveying R&D to manufacturing sectors in such a way to increase their innovation capacity. In particular, the extent to which KIBS are related to an underlying production transaction – in a sort of software/hardware relationship – is a key aspect for their innovative impact on manufacturing. From a policy point of view, this result provides an interesting insight into the choice of the so-called key-enabling technologies through which manufacturing can be advanced towards more innovative developments.

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Appendix

Table A1. Nace Rev.1 sectoral disaggregation of patent applications data.

15	Manufacture of food products and beverages
16	Manufacture of tobacco products
17	Manufacture of textiles
18	Manufacture of wearing apparel; dressing and dyeing of fur
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
20	Manufacture of wood and of products of wood and cork, except furniture;
21	Manufacture of pulp, paper and paper products
22	Publishing, printing and reproduction of recorded media
23	Manufacture of coke, refined petroleum products and nuclear fuel
24	Manufacture of chemicals and chemical products
24.1	Manufacture of basic chemicals
24.2	Manufacture of pesticides and other agro-chemical products
24.3	Manufacture of paints, varnishes and similar coatings, printing ink and mastics
24.4	Manufacture of pharmaceuticals, medicinal chemicals and botanical products
24.5	Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations
24.6	Manufacture of other chemical products
24.7	Manufacture of man-made fibres
25	Manufacture of rubber and plastic products
26	Manufacture of other non-metallic mineral products
27	Manufacture of basic metals
28	Manufacture of fabricated metal products, except machinery and equipment
29	Manufacture of machinery and equipment n.e.c.
29.1	Manufacture of machinery for the production and use of mechanical power, except aircraft, vehicle and cycle engines
29.2	Manufacture of other general purpose machinery
29.3	Manufacture of agricultural and forestry machinery
29.4	Manufacture of machine-tools
29.5	Manufacture of other special purpose machinery
29.6	Manufacture of weapons and ammunition
29.7	Manufacture of domestic appliances n.e.c.
30	Manufacture of office machinery and computers
31	Manufacture of electrical machinery and apparatus n.e.c.
31.1	Manufacture of electric motors, generators and transformers
31.2	Manufacture of electricity distribution and control apparatus
31.3	Manufacture of insulated wire and cable
31.4	Manufacture of accumulators, primary cells and primary batteries
31.5	Manufacture of lighting equipment and electric lamps
31.6	Manufacture of electrical equipment n.e.c.
32	Manufacture of radio, television and communication equipment and apparatus
32.1	Manufacture of electronic valves and tubes and other electronic components
32.2	Manufacture of television and radio transmitters and apparatus for line te
32.3	Manufacture of television and radio receivers, sound or video recording orlephony and line telegraphy
33	Manufacture of medical, precision and optical instruments, watches and clockS
33.1	Manufacture of medical and surgical equipment and orthopaedic appliances
33.2	Manufacture of instruments and appliances for measuring, checking, testing , navigating and other purposes, except industrial process control equipment
33.3	Manufacture of industrial process control equipment
33.4	Manufacture of optical instruments and photographic equipment
33.5	Manufacture of watches and clocks
34	Manufacture of motor vehicles, trailers and semi-trailers
35	Manufacture of other transport equipment
36	Manufacture of furniture; manufacturing n.e.c.

Table A2. ISIC Rev.1 sectoral classification of input-output tables.

R1: C01T05 Agriculture, hunting, forestry and fishing
R2: C10T14 Mining and quarrying
R3: C15T16 Food products, beverages and tobacco
R4: C17T19 Textiles, textile products, leather and footwear
R5: C20 Wood and products of wood and cork
R6: C21T22 Pulp, paper, paper products, printing and publishing
R7: C23 Coke, refined petroleum products and nuclear fuel
R8: C24 Chemicals and chemical products
R9: C25 Rubber and plastics products
R10: C26 Other non-metallic mineral products
R11: C27 Basic metals
R12: C28 Fabricated metal products except machinery and equipment
R13: C29 Machinery and equipment n.e.c
R14: C30 Office, accounting and computing machinery
R15: C31 Electrical machinery and apparatus n.e.c
R16: C32 Radio, television and communication equipment
R17: C33 Medical, precision and optical instruments
R18: C34 Motor vehicles, trailers and semi-trailers
R19: C35 Other transport equipment
R20: C36T37 Manufacturing n.e.c; recycling
R21: C40T41 Electricity, gas and water supply
R22: C45 Construction
R23: C50T52 Wholesale and retail trade; repairs
R24: C55 Hotels and restaurants
R25: C60T63 Transport and storage
R26: C64 Post and telecommunications
R27: C65T67 Finance and insurance
R28: C70 Real estate activities
R29: C71 Renting of machinery and equipment
R30: C72 Computer and related activities
R31: C73 Research and development
R32: C74 Other Business Activities
R33: C75 Public admin. and defence; compulsory social security
R34: C80 Education
R35: C85 Health and social work
R36: C90T93 Other community, social and personal services
R37: C95 Private households with employed persons

*Table A3. Sectoral disaggregation adopted for the study
Manufacturing*

C15T16 Food products, beverages and tobacco
C17T19 Textiles, textile products, leather and footwear
C20 Wood and products of wood and cork
C21T22 Pulp, paper, paper products, printing and publishing
C23 Coke, refined petroleum products and nuclear fuel
C24 Chemicals and chemical products
C25 Rubber and plastics products
C26 Other non-metallic mineral products
C27 Basic metals
C28 Fabricated metal products except machinery and equipment
C29 Machinery and equipment n.e.c
C30 Office, accounting and computing machinery
C31 Electrical machinery and apparatus n.e.c
C32 Radio, television and communication equipment
C33 Medical, precision and optical instruments
C34 Motor vehicles, trailers and semi-trailers
C35 Other transport equipment
C36T37 Manufacturing n.e.c; recycling
<i>Services and KIBS</i>
C64 Post and telecommunications
C65T67 Finance and insurance
C70 Real estate activities
C71 Renting of machinery and equipment
C72 Computer and related activities
C73 Research and development
C74 Other Business Activities

Table A4. Variables data sources by country.

	Patent applications	Input-output tables	R&D Expenditures	Fixed investments	Employment
Data-source Country	<i>PATSTAT EPO Dataset</i>	<i>OECD-IO Database</i>	<i>OECD Anberd</i>	<i>OECD-STAN</i>	<i>OECD-STAN</i> ...
France	Years – years	1995, 2000, 2005	(1995, 2000, 2005)	(1995, 2000, 2005)	(1995, 2000, 2005)
Germany	Years – years	1995, 2000, 2005	(1995, 2000, 2005)	(1995, 2000, 2005)	(1995, 2000, 2005)
UK	Years – years	1995, 2000, 2005	(1995, 2000, 2005)	(1995, 2000, 2005)	(1995, 2000, 2005)
Italy	Years – years	1995, 2000, 2005	(1995, 2000, 2005)	(1995, 2000, 2005)	(1995, 2000, 2005)

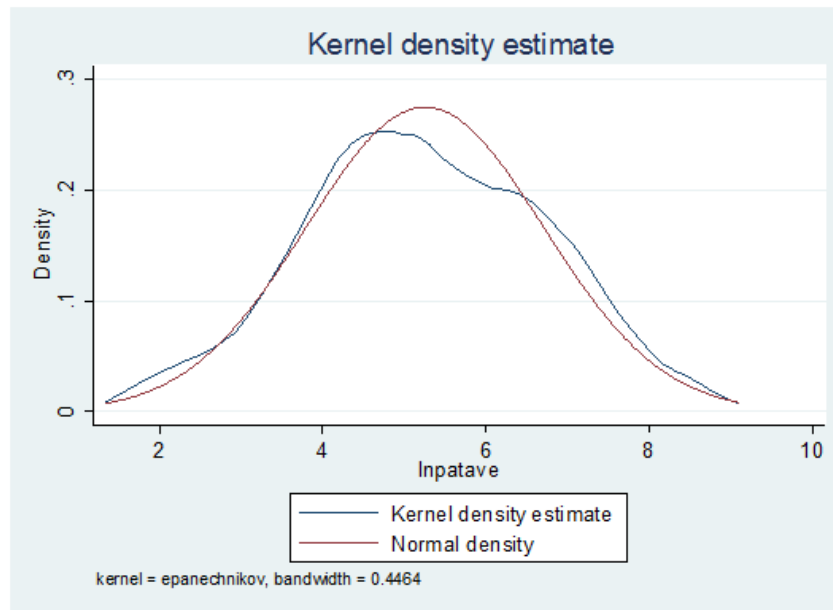


Figure A1. PATAVE distribution.

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Agile New Service Development in an Interdisciplinary Context: KIBS as an Interface between Life Sciences and Engineering & Automation

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A case study shows the role of services in a highly interdisciplinary context. The article describes how a new service offering is developed systematically using an agile development approach. Moreover, the knowledge gained for services research from the practical case study in the field of knowledge-intensive business services (KIBS) in an early phase is shown.

1 Introduction

1.1 Point of Departure

The present article shows a successful transfer of study results into the practical application of services and how these findings can be used for the theory of services research. BioRegio STERN Management GmbH is a German service company located in the federal state of Baden-Württemberg supporting the economic development of the life sciences industry. The service portfolio of the company falls within the category of the so-called *Knowledge-Intensive Business Services* (KIBS) and mainly consists of highly specialized consulting services for e.g. business development, grant applications and corporate finance. Their target groups are business founders, entrepreneurs and researchers in the life sciences industry. One of the main objectives is to initiate cross-sector cooperation between life sciences and engineering & automation to expose considerable synergy potential beyond their core businesses. Both represent economically strong and important industries in Baden-Württemberg. Combining these two industries should strengthen the industrial location and help life sciences to achieve an improved economic efficiency.

At present, the life sciences industry is predominantly producing small quantities using time-consuming manual processes. Since life sciences are highly subjected to requirements such as efficiency, quality, reproducibility and human safety, innovative automation solutions are gaining importance. Engineering & automation may develop customised, flexible automation solutions across the complete product creation process (e.g. automated cell cultures, regenerative implants).

The challenges for building up interdisciplinary cooperation activities include difficulties in finding suitable partners, stringent regulations due to current legislation, differences between the two industries in their ways of working, corporate cultures and specialized technical terminologies. To overcome these obstacles an appropriate service platform should be established in order to support projects at the interface between engineering and natural sciences. In this respect, a preliminary study was carried out to analyse the market potential and to assess cooperation conditions between the participating industries. The results of the study provide the basis for conceiving a service programme for active networking of two industries previously alien to each other.

The *New Service Development* discipline provides methods and tools for the development of KIBS. However, since this is about complex business services which are provided in close interaction with customers and since the present sample case additionally involves the factor of interdisciplinarity, the development process needs to be customised. In this way, services research is able to gain knowledge from practical application.

1.2 Methodical Approach

The present article is based on a sample case from BioRegio STERN Management GmbH and describes how KIBS can be developed systematically for a previously unknown market and introduced at only a minimum of risk by choosing an agile and prototypical approach. The methodology can be described along the phases of a new service development process (cf. Figure 1): Idea finding and evaluation, requirements analysis, service design, test, implementation and market launch.

The decisive factors for the recognition of a need were the preceding activities within the ELSA project ("Clusterinitiative Engineering – Life Sciences – Automation"). The prime questions derived there were included in the empirical survey identifying requirements for the new services to be developed.

A specific focus was on the compilation of requirements (combination of a broad survey and in-depth interviews for case studies) and on testing the service offerings, which can be structured according to two phases. Test phase 1 focuses on the prototypical test of the service concept while test phase 2 uses the lead-user approach for further trial and optimisation of the service offering. The company is currently still in the conceptualization and test phase. Along with the implementation and market launch, continuous optimisation and customisation of the offering to current requirements will be performed.

Industry-specific particular circumstances are considered both in the approach for new service development of the BioRegio STERN Management GmbH and for the development model chosen; these will be described in detail in another section below.

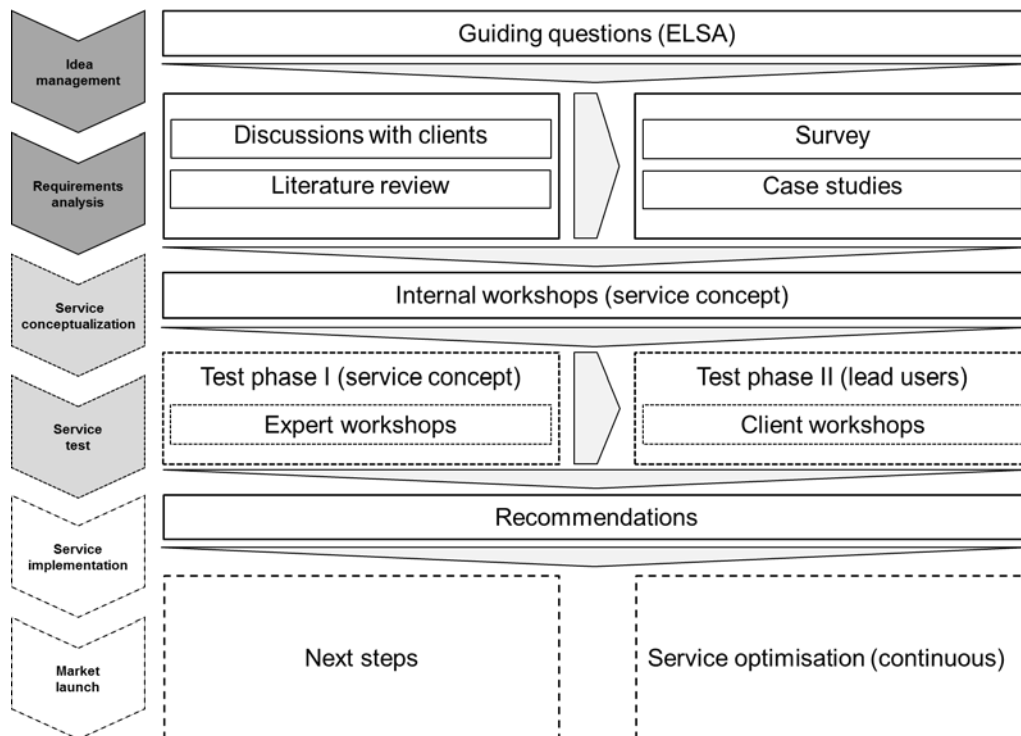


Figure 1. Approach used in the present case study.

Furthermore, findings that are useful for services research are reflected and shown explicitly in parallel to the practical development process. Hence, the sample case is a hands-on trial of a procedure model in the context of KIBS in a highly interdisciplinary environment. This results in new knowledge being fed back into the development process and makes it possible to recognise further need for the development of new services.

2 Interdisciplinarity in Cooperation Projects between Engineering & Automation and Life Sciences

2.1 Particular Characteristics of the Life Sciences Industry

Enterprises of the life sciences industry are active in the fields of biotechnology, medical technology or pharmaceuticals. They develop drugs, diagnostics or innovative substances. Although innovative products and processes of the life sciences industry involve very long development periods, they reach marketability step by step and generate an increasing demand. Enterprises of the life sciences industry must be competitive world-wide and comply with international quality standards and legal regulations. Requirements such as efficiency, quality and safety for human beings also apply to these products. Refer to Figure 2 for a detailed listing of the key words.

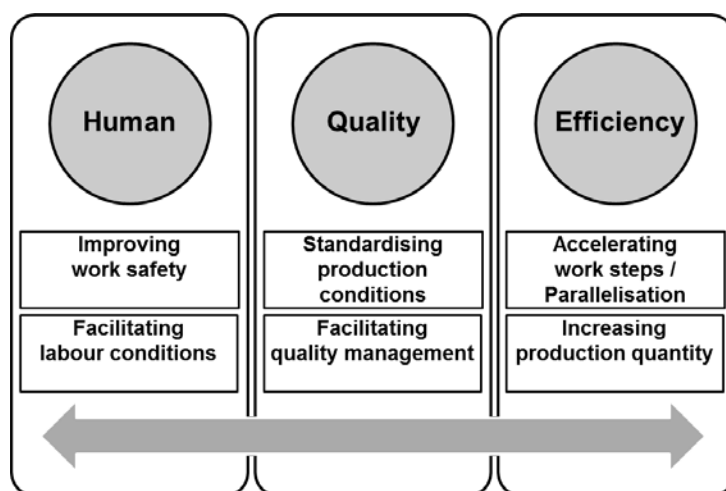


Figure 2. Key words characterising current challenges in the life sciences industry⁹⁷.

These products have usually been developed and manufactured at a laboratory scale, manually and in small quantities to date. This is an issue with regard to requirements. A possible solution to this may be using the services of engineers from the automotive supplier, mechanical engineering or automation industries. These develop equipment and processes together with the life sciences enterprises in order to attain readiness for marketing of the products more quickly. Hence, innovative automation solutions will become very important in the future. Engineering & automation may offer technical solutions for the complete process of product development or support process optimisation in life sciences. Some examples are miniaturised and more reliable diagnostic platforms or liquid handling systems. There will be a particularly high need of automation know-how especially in personalised medicine such as individual therapy, e.g. for tumour diseases. Personalisation will play an increasing role also for medical products: Therapeutic single-piece products such as artificial skin, intervertebral disc or cartilage replacements are developed and manufactured individually for specific patients. The individualisation is based on the single-piece production process. Furthermore, in compliance with the new EU chemical directive *REACH* – *Registration, Evaluation, Authorisation and Restriction of Chemicals*, cells in large volumes for testing of substances, chemicals and cosmetics need to be produced. The high demand for human cells can only be met with the aid of automated cell culture application or tissue factories. The use of automated processes becomes more and more important in order to reach the required quality standards such as GMP, DIN and ISO (cf. Ballesteros; Schell, 2012).

2.2 Particular Characteristics in the Engineering & Automation Industry

Enterprises of the engineering & automation industry are active in automation technology, machine building and mechanical engineering. While the concepts of automation technology, machine building and plant construction rather describe technical specialisations and the utilisation of technical solutions for production, the concept of engineering refers to upstream services and comprises activities such as consulting, planning and conceiving technical solutions. Many enterprises of the engineering and automation fields are currently predominantly active in the automotive industry. However, the life sciences industry offers a great economic potential for the automation industry, since particularly biotechnology is a key and interdisciplinary technology with a significant potential for growth, highly dynamic innovation and increasing demand. In order to be used successfully in the life sciences industry, automation solutions should be both miniaturised and flexible in use and, in addition, ensure that process costs can be reduced. The same is true for an intuitively operated and user-friendly control system. Usually, the production quantity is comparatively small. Automation can also be used to implement and optimise processes from the life sciences industry in parallel. Standardisation of automation, on the other hand, is relatively difficult in the field of life sciences due to individualized products. Potential opportunities appear in the area of production technologies that can be used to manufacture products for medical diagnostics in high volumes or for implants at a high precision. Other potential areas are liquid handling, statistic test planning for parameter optimisation or workflow control of laboratory processes using workflow management systems (cf. Ballesteros; Schell, 2012).

2.3 Cooperation between the two Industries – Current State of Affairs

Cooperation between the two industries is currently still in the fledgling stages. A few cooperation projects exist, with a tremendous potential for intensifying the matter. In order to promote such interface projects between life sciences and engineering & automation in a target-oriented way, the BioRegio STERN Management GmbH founded the "*Clusterinitiative Engineering – Life Sciences – Automation*", in short *ELSA*. Within this initiative, the existing regional

⁹⁷ Modified from Schraft; Kaun, 1998

clusters of the life sciences industry are linked with those of automation technology, machine building and automotive suppliers. Automation technology as well as machine building and plant construction are considered as key industries in the STERN BioRegion. The preconditions for cooperation between engineering companies and enterprises from the life sciences industry are therefore unique in this region. ELSA is intended to strengthen the industrial location, to help life sciences to achieve an improved economic efficiency and to open up a new market for the engineering and automation industry.

Albeit there is a high potential, the cooperation between engineers and life scientists at first glance involves a number of challenges that are due to the differences existing between the industries. This includes, among other factors, difficulties in finding suitable partners and stringent regulations due to current legislation. Moreover, special challenges are the different ways of working, the corporate cultures and the specialised technical languages. The differences are graphically illustrated in Figure 3.

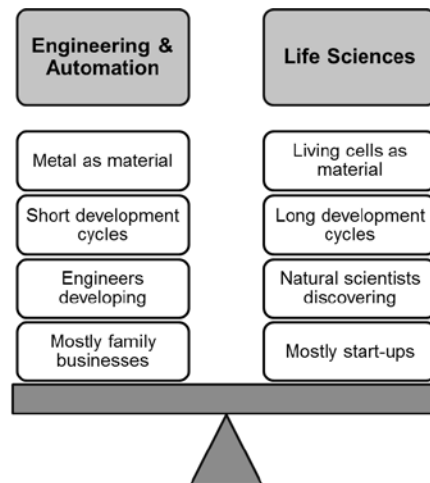


Figure 3. Differences between the engineering & automation and life sciences industries⁹⁸.

As a result of these contrasts, interdisciplinary work is a prerequisite for realising interface projects between engineering & automation and life sciences. In this respect, an appropriate service offering is intended to provide support to both life science and engineering & automation enterprises in order to facilitate the link between these industries. In order to be able to develop such a suitable offering, it is necessary to first investigate the general market and cooperation conditions since these are completely uncharted economic waters (cf. Ballesteros; Schell, 2012).

3 Conceptual Design of the Study

3.1 Initial Situation and Objectives

The objective of the study was to determine the current state of affairs of cooperation projects between the engineering & automation and life sciences industries to convey market requirements.

The following individual issues were addressed:

- Determining the general attitude towards cooperation projects within and between the engineering & automation and life sciences industries
- Determining the potential for automation in the life sciences industry
- Deriving recommendations for the life sciences industry
- Deriving recommendations for the engineering & automation industry
- Supporting the cooperation of engineering & automation and life sciences as two industries which are still alien to each other

One particular characteristic of the project work is the high degree of customer focus (e.g. involvement of partners referred to as lead users). Another one is that it is an employee-driven project, which had a very motivating effect on the complete project team. Furthermore, the success factor of interdisciplinarity should be emphasized; it existed because of the close cooperation between an engineer and a biologist and facilitated mutual learning processes.

3.2 Survey Method and Data Basis

The study was structured according to two components: Broad survey (1) and case studies (2). The methodology is described in more detail below and illustrated in Figure 4.

⁹⁸ Cf. Ballesteros; Schell, 2012

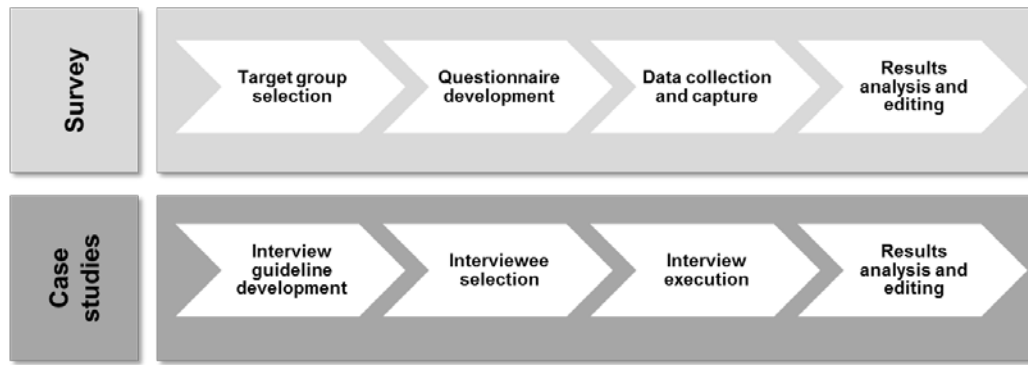


Figure 4. Methodology and components of the study.

(1) Survey

The survey was intended as the core foundation for determining market requirements and deriving a service offering to support cooperation between the two industries. Since it is a new field of study, i.e. cooperation between the two industries was uncommon before, and because of the promising prospects, this was a certain challenge and therefore highlights the explorative nature of the survey. Target groups for the survey were decision-makers (strategic positions) of enterprises from both industries. In order to safeguard comparability but also to be able to address the specific aspects of both industries, the representatives of the industries were addressed with questionnaires of the same structure but with individual questions customised to the target groups. The questionnaires were made available to the persons interviewed in both printed (sent by mail) and digital (sent by e-mail) formats and in an online version (Limesurvey®). In addition to cooperation between the life sciences and engineering & automation industries, also general issues relating to cooperation and specifically "cooperation within the life sciences industry" were subjects of the study in order to be able to derive the requirements and fields of action. The latter subject was particularly interesting in order to find out whether life sciences enterprises cooperate at all or do not usually enter into cooperation – neither within its own industry nor with other industries.

Table 1. Study outline of the broad survey.

Study Outline	
Target groups	Life sciences Engineering & automation
Areas of study	Cooperation in general Cooperation within the life sciences industry Cooperation between life sciences and engineering & automation industries Future development of cooperation projects between the two industries
Scope of study	131 enterprises
Period of study	September and October 2012

Both general factors for success and failure of cooperation projects and industry-specific issues which may have an impact on the cooperative behaviour were considered when preparing the questionnaire.

The following individual areas of study were subject of the survey:

- Cooperation projects by industries
- Attitude of the industries towards mutual cooperation
- Factors for successful cooperation
- Instruments for initiating cooperation
- Obstacles when initiating cooperation
- Need for support for initiating cooperation
- Reasons for cooperation with the other industry
- Successful cooperation projects between the industries
- Preferred forms of cooperation by industries
- Supply and demand of automation solutions for life sciences
- Fields of cooperation within the life sciences industry
- Attitude towards cooperation with the engineering & automation industry
- Fields of cooperation within the engineering & automation Industry

- Attitude towards cooperation with the life sciences industry
- Future cooperation projects between the industries
- Readiness to take action to support cooperation

The analyses were made using the statistics software IBM® SPSS® Statistics 20. The percentages specified refer to the valid answers. Rounding up or down may result in totals deviating slightly from 100 percent. Only those findings were included in the preparation and documentation of the study results which had a sufficiently high significance from the statistical point of view.

Target group profiles

43 percent of companies participating can be categorised to form part of the life sciences industry, 57 percent are from the engineering & automation industry. Most of the life science companies are from the fields of biotechnology (36 percent) and medical technology (38 percent), a smaller portion from pharmaceuticals (6 percent). The persons interviewed from the engineering & automation industry see themselves in the fields of automation technology (43 percent), machine building (35 percent) and engineering (24 percent), with some of the companies positioning themselves in more than one of the three fields, representing possible focuses.

(2) Case studies

In order to gain more profound knowledge about challenges and approaches in the cooperation between enterprises in the life sciences and engineering & automation industries, semi-structured in-depth interviews were made with two representatives each of both industries. All of the total of four case studies prepared from this are "lighthouse examples" of functional and fruitful cooperation. Nevertheless, obstacles surfaced which make it necessary to resort to external consulting and support in both industries from the point of view of the representatives of the companies interviewed (cf. Ballesteros; Schell, 2012).

The following individual areas of study were subject of the expert interviews for the case studies:

- Experience from cooperation projects with the other industry
- Opportunities in cooperation projects with the other industry
- Risks in cooperation projects with the other industry
- Solutions applied in the area of life sciences
- Utilisation of external support when initiating cooperation projects
- Criteria for the selection of cooperation partners from the other industry
- Criterion for success of cooperation with the other industry
- Specific sample case of cooperation with the other industry
- Nature and scope of the cooperation project
- Motivation and special characteristics of the cooperation project
- Channels and instruments used for initiation
- Barriers within the cooperation project
- Specific project objectives, competitive advantages and innovations achieved
- Future development of cooperation with the other industry
- Future potentials of engineering & automation solutions for life sciences

4 Results of the Study

The study revealed core findings which are fundamental to establishing a service offering tailored to the needs of the industry and target group. First, the synergies from cooperation of both industries are recognised and there is a substantial need for consulting services regarding mutual cooperation. The factors for success determined for cooperation activities can be outlined by these keywords: **building trust, interdisciplinarity, interface personnel and professional project management**. Moreover, it was possible to identify *obstacles and challenges* which may lead to conflicts between industry experts and which are intended to be specifically addressed by the service offering. This includes, above all, **financing issues, lack of contacts and ideas, lack of industry-specific know-how, different objectives and intentions, technical languages and time horizons**. It is necessary to try to find a common level of language between the two industries. In addition, **finding suitable partners** is an issue for many enterprises. For engineering & automation enterprises, a **lack of human resources** and **different corporate cultures** are additional obstacles for cooperation projects. Refer to figure 5 for a summary of the results.

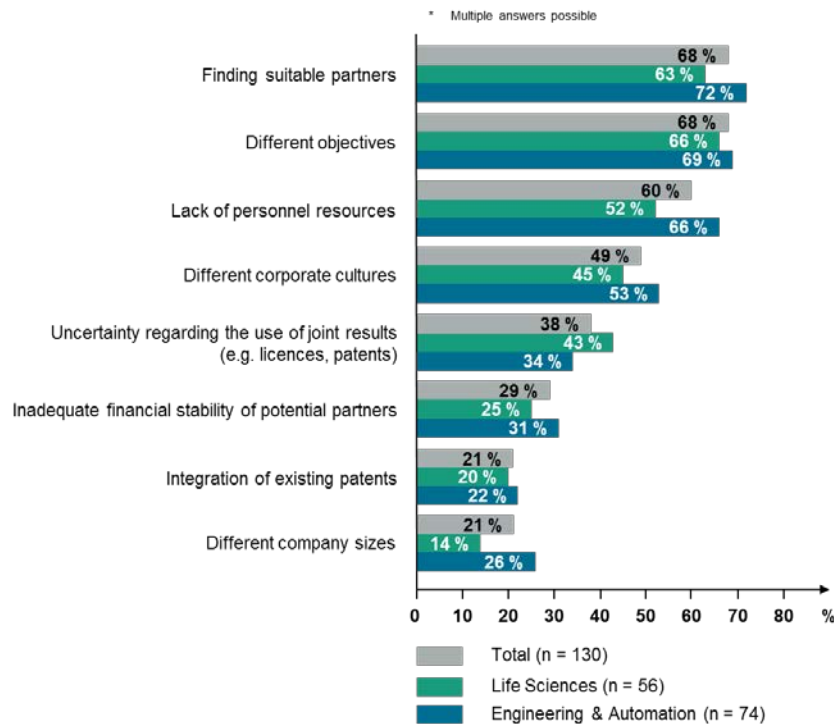


Figure 5. Typical obstacles when initiating cooperation projects.

Important and useful *instruments for initiating cooperation projects* are, in particular, **recommendations from existing partners**. Hence, the personal component plays an important role and supports building trust. This is an interesting focus for new service development. The second rank among useful instruments is held by **personal networks of the enterprise's own employees**. Hence, it is important that individual employees are able to establish contacts autonomously in order to be successful in a cooperation project. Similarly, **events** (e.g. conferences, meetings, fairs, information and matching events) and **activities of industry associations and networks** (rated equally on an average) are among the top 3. The latter initiation instrument, however, is predominantly emphasized by enterprises with a tendency to a higher potential of innovation. Online platforms play only a minor role, the human factor is at the focus.

With regard to the *need for support when initiating cooperation projects* (see figure 6), particularly **contractual issues** and the **procurement of cooperation partners** are mentioned. In particular, enterprises from the life sciences industry expressed a need for support in the contractual arrangement of the cooperation (64 percent versus 41 percent among engineering & automation enterprises). Numerous enterprises from the engineering & automation industry find ratings of potential cooperation partners useful (35 percent). With regard to the need for support, there is also a difference between enterprises with a high and those with a slightly lower potential for innovation. The more innovative ones, for example, think that the procurement of cooperation partners (55 versus 36 percent) and support in the contractual arrangement of the cooperation (52 versus 39 percent) are more important. Enterprises with a lower degree of innovativeness usually rate content-related support in the arrangement of the cooperation higher than the more innovative ones (30 versus 18 percent). Although **training of employees** involved is at a very low rank (15 percent), there is a general agreement that support is needed in this area. However, enterprises with a lower potential for innovation emphasize this aspect more than those with a higher potential for innovation (27 versus 9 percent). With regard to the contractual arrangement of the cooperation, need for support is expressed rather by small and medium-scale enterprises (SME) than by large-scale corporations (52 percent of SMEs versus 21 percent of corporations). In order to determine the readiness of the enterprises to enter into cooperation projects with the other industry, specific potential activities were suggested. It is striking that enterprises from the engineering & automation industry show a higher readiness to take action relating to company strategy, organisation and human resources in order to give an impetus to such cooperation. The engineering & automation enterprises already acknowledge the significance of in-house interdisciplinarity and can easily imagine hiring specialists from the domain of life sciences directly. However, since the overall readiness is only average, it is evident that cooperation projects are currently rather based on loose constructs of individual enterprises than on close intermeshing of industries (cf. Ballesteros; Schell, 2012).

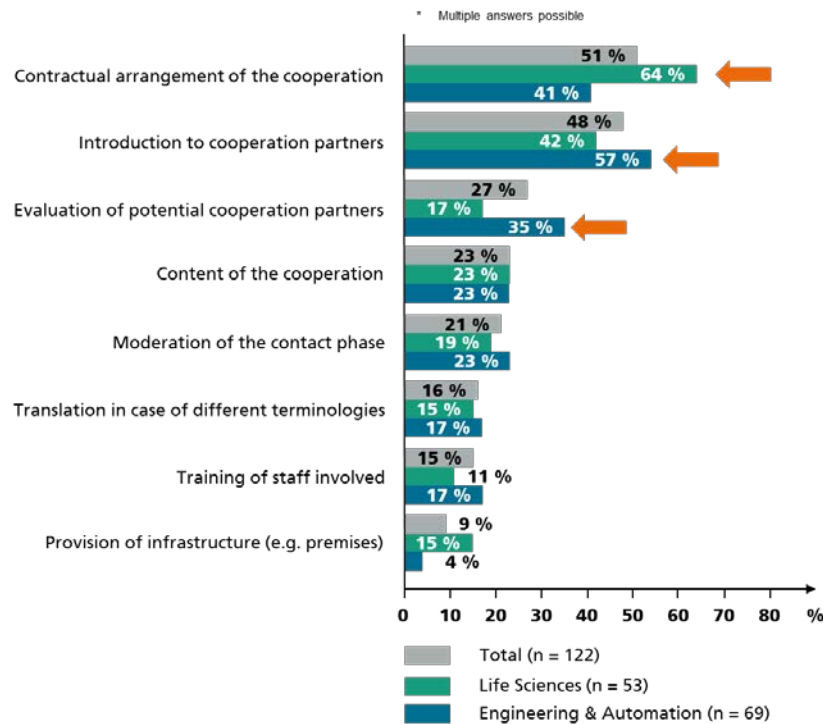


Figure 6. Need for support when initiating cooperation projects.

There are also differences with regard to supply and demand of automation solutions for the life sciences industry. The life sciences enterprises were asked about applications of such solutions in order to assess which ones are currently of interest. In order to compare the demand with the supply of automation solutions for life sciences, engineering & automation enterprises were also asked about their automation solutions being used by life sciences enterprises. The results differ. For example, life sciences enterprises are currently using predominantly solutions from the fields of measurement and electrical technology (65 percent), microelectronics and sensor technology (60 percent) as well as information and communication technology (55 percent). In contrast, there are engineering & automation enterprises specialising particularly in the fields of production technology (64 percent), robotics, development and manufacture of single special machines (47 percent). At first glance, the offering of the engineering & automation enterprises and the demand on the part of the life sciences enterprises for automation solutions for life sciences diverge, however, the opinions with regard to the future importance of individual solutions are very similar. This means that the industries will probably show a sufficient amount of future connecting factors and do not move into entirely different directions at least with regard to their expectations.

The results from the expert interviews are useful as a supplement to the broad survey and for the development of good practice examples. All in all, there is still work to be done to make the two industries aware of each other. It has also been confirmed that engineering enterprises getting into the life sciences industry need support in order to familiarize themselves with **licensing regulations**, market requirements, **business models** and **market access options**. Moreover it is important to find a suitable partner who understands one's own industry. This may involve that engineering & automation enterprises have competencies in the specific fields of application of life sciences – or vice versa that life sciences enterprises are staffed properly to recognise their potential for automation. **Joint networking events** and **fairs** play an important role to facilitate meeting each other. However, representatives of both industries frequently tend to go to fairs of their own industry. Especially biotechnology and medical technology specialists need to be brought closer to automation fairs by platforms like ELSA. With a view to increasing the cooperation between engineering & automation and life sciences, enterprises with a think tank function play a core role. They can complement the lack of interdisciplinary work in an enterprise and generate new automation solutions for life sciences.

5 Transfer of Results to the Practice of Services

The following requirements and needs for the development of a service offering to support cooperation between the two industries can be derived by considering the service concept and the results of the study:

Bringing together the demand and the offering

The offerings of engineering & automation enterprises and the demand of life science enterprises for automation solutions differ. This is a starting point for new service development. This divergence can be adjusted by addressing individual companies directly. For example, a campaign could be launched to directly attract new companies from

measurement and electrical technology to the market of life sciences since the need in the life sciences industry is greater than the current supply.

Personal contacts

The human factor and direct interaction play a core role in supporting the initiation of cooperation. Merely sending information material or providing a service on call (e.g. telephone hotline, online platforms and chats) will not get a service provider very far. It is much more important to actively facilitate interaction between potential cooperation partners. Other program-specific services such as "business speed dating" or cooperation exchange may be offered as future services in addition. An on-line platform may be implemented. However, the personal component should be reinforced, for example, by information events or video presentations.

Training and workshops

This aspect is closely related to the previous one (personal contacts). Although only a minority of the persons interviewed mentioned qualification issues explicitly, a need for training can be deduced implicitly. In addition to the transfer of knowledge to employees involved, particularly in companies having less experience with cooperation, or about companies of the other industry, the subject of awareness raising also plays an important role. In particular, such trainings and workshops can support engineering & automation enterprises in reducing fear of differences in corporate cultures. In this regard, a training or joint workshop proves to be more helpful than written materials (e.g. information brochures). Other content that may be offered are subjects specifically tailored to the enterprises such as: "*Production and Automation for Natural Scientists*" or "*Life Sciences for Engineers*". Training about the economic efficiency of projects or the design of requirements specifications and detailed specifications is also interesting.

Differentiation by industries

It has become evident that the two industries are more similar as expected. This facilitates the arrangement and organisation of shared offerings (e.g. events). However, there are also industry-specific needs and obstacles that have to be addressed in different ways. While for life science enterprises (especially for SMEs) support in the contractual arrangement of cooperation projects tends to be important (designing the cooperation), enterprises in the engineering & automation industry rather need support for the evaluation of potential cooperation partners and to reduce constraints (initiating contacts). Hence, automation companies need support at an even earlier stage in the process before entering into the cooperation. However, providing an evaluation of cooperation partners as a service turns out to be difficult because usually there are no indicators yet about the enterprises from the life sciences industry. Nevertheless it is interesting to offer external project management for interface projects as a service. This service considers obstacles and constraints in the cooperation and includes them into the project management task.

Interdisciplinarity and communication

Interface personnel is an important issue on two levels: first within the enterprises themselves, second with a view to the consulting services. Not only the two industries need an interdisciplinarity approach to understand the other industry and to be able to cooperate better, but also external service providers intending to support cooperation projects between the two industries. For example, a "translation service" between the two industries could be considered: Either in terms of a dictionary or in terms of a personal translation that can be requested for project meetings. Such a service addresses the different specialised languages which are often a cause for failure of interdisciplinary cooperation.

Visualisation

Visualisation can be viewed as another interesting field. For example, laboratory processes can be visualised for a better presentation. The biotechnology specialist recognises the processes and can identify with automation more easily. A biotechnology truck or exhibition events organised at enterprises which are able to show that lab automation products are also interesting. Rapid prototyping could also be used to present ideas visually in a quick and efficient way.

Since the sample case of the BioRegio STERN Management GmbH deals with the development of new services in an entirely new market – support of cooperation between two industries, which are (still) fairly unknown to each other – the uncertainty and the risk of undesirable developments are particularly high. The company therefore is using a systematic approach to avoid developing services that "miss the market" but rather align them with the requirements of both industries. The development and testing activities were geared to a procedure model (see figure 7) which takes all phases of new service development into account: idea management, requirements analysis, service conceptualization, test, implementation and market launch.

The research disciplines *New Service Development* and *Service Design* did not become known before the Eighties of the 20th century. In the Nineties, the concept of *Service Engineering* emerged. This concept describes the systematic development and design of services using suitable models, methods and tools – and thus adopts to some extent the approach of product and software development common in the engineering sciences. Since the time when the research

discipline emerged, numerous methods and instruments for the design of services have been developed (e.g. Bullinger; Fähnrich; Meiren, 2003; Bullinger; Scheer; 2003; Salvendy; Karwowski, 2010; Scheer; Spath, 2004).

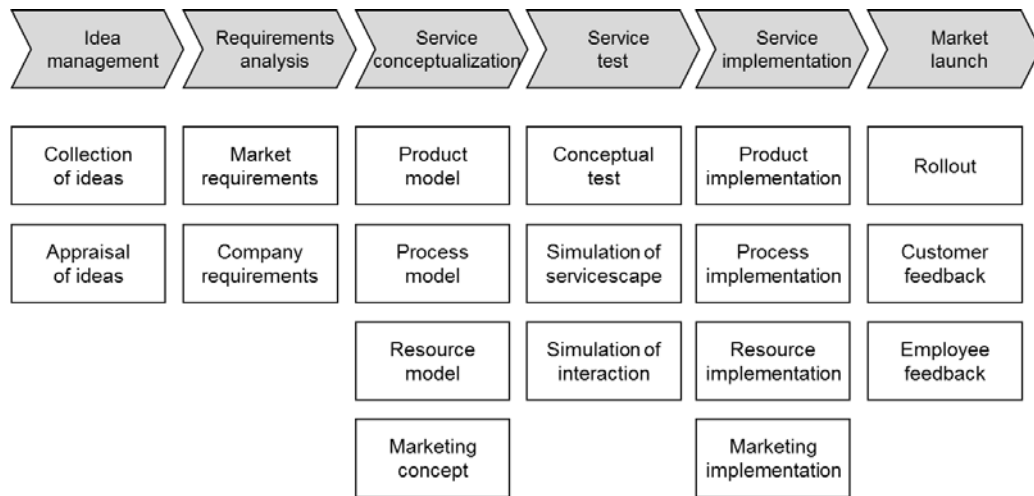


Figure 7. Service Engineering process (according to Burger; Kim; Meiren, 2010).

In contrast with other concepts from services research (cf. Scheuing; Johnson, 1989; Ramaswamy, 1996; Edvardsson, Olsson; 1996; Shostack; Kingman-Brundage, 1991; Jaschinski, 1998), which are usually structured either sequentially or iteratively (cf. Schneider; et al., 1998), this model features modularity as a property. At first glance, the chosen procedure seems to be rigid and linear, i.e. without any iteration or optimisation loops provided. For this reason, the model was slightly modified *in application*, without making any change to the fundamental idea. The background for this is the concept of **agile development** such as it is known, for example, from software engineering. Here, iterations are provided which permit returning or jumping to other phases in order to be able to respond to errors and any optimisation opportunities at an early stage; so an incremental availability of the result is possible (Moran, 2014). In the sample case, for example, iterations were inserted between idea management and the requirements analysis, between service conceptualization and test as well as between service implementation and market launch.

Further, the present case is about KIBS. KIBS and the associated sectors and sub-sectors are usually defined on the basis of the *Classification of Economic Activities in the European Community* (NACE) and mapped to the parameters 71 to 74 (see figure 8).

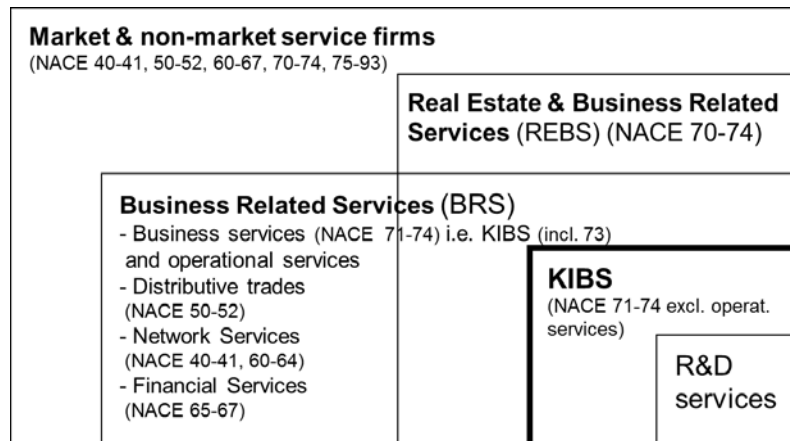


Figure 8. Classification of KIBS in the NACE (Hertog; et al., 2006).

KIBS are generally defined as services provided on the basis of specialised knowledge. Their provision and use could lead to a growth of knowledge (cf. Muller; Doloreux, 2007; Schnabl; Zenker, 2013; Schricke; Zenker; Stahlecker, 2012). Particularly consulting services fall into this category, for example, business consulting, technology consulting, engineering and market research. Knowledge-intensive services, also referred to as knowledge-focused services, are usually characterised by a high contact intensity with customers and a high number of variants (cf. Baumgärtner; Bienzeisler, 2007). For the present sample case of BioRegio STERN Management GmbH, this results in a certain complexity (e.g. specific nature of the customer's problem and of the technical or scientific field) and interactions with the customers become necessary in the service processes (e.g. analysis of the initial situation, data collection at the customers, acceptance of the result by the customer). These particular characteristics should be taken into account as early as possible during the development process.

The individual phases of the procedure model as well as the backgrounds for customisation are described below.

Idea management and requirements analysis

In order to be able to develop and select sustainable ideas, the company first required to know the market and its requirements. This is particularly important because the market is fairly unknown with regard to cooperation between industries. In addition, the differences between the industries had to be addressed in this phase. Each industry has its specific requirements which have to be considered. After the first collection of ideas on the basis of various informal interviews and a workshop with representatives of potential target groups, specific requirements were established (see survey and case studies). The ideas were subsequently refined by supplementing, delimitation and evaluation before making a selection. It was worked out in detail which advantages result for "customers" from using the service. In the context of BioRegio STERN Management GmbH, the "customers" are the cluster protagonists. Since the objective is to establish further cooperation projects at the interface of life sciences and engineering & automation, the services are defined in such a way that this objective can be achieved. Those enterprises which will use the services are to be enabled to enter into a cooperation more easily.

Service conceptualization and test

It is not possible to cover all customer groups of the target industries and service scenarios with an initial service concept because of the individual nature of the need for support between the industries and the large number of possible cooperation constellations. In order to align the service offering with the real customer needs, which may be higher than evident from the information obtained from the requirements analysis, an early concept test of the planned offerings is made with pilot customers in workshops and individual interviews. Subsequently, the service concept is aligned with the more detailed requirements. This prototyping method prevents the enterprise from being too late in recognising needs for adjustment and unnecessary costs (e.g. for production of sales brochures, procurement activities, purchasing external consulting services or recruitment of new employees) which would have been incurred by a service concept that might have failed in the market.

Service implementation and market launch

Iterations involving re-testing and re-engineering or a further development of the service offering are also provided between the last two phases – the implementation of the service and its rollout in the market. Hence, the agile approach runs throughout the complete new service development process. The BioRegio STERN Management GmbH is currently preparing for the transition to the two phases of conceptualization and test as well as implementation and market launch. The close cooperation with pilot customers or partners with a lead user role makes it possible to run these two phases nearly in parallel and upscale them for additional customers in case of successful adaptation. A critical factor may be that the market does not accept the service in spite of the conducted market analysis. A risk assessment is carried out and accompanies the new service development.

6 Summary and Conclusion

The application of the selected procedure model worked in the sample case without any problems. The modular nature allowed individual adjustments and jumping between phases even though this is not depicted in the process model itself. The degrees of freedom that were utilised in the model are described below. They show points of departure for the further development of procedure models for new service development.

Agile new service development, testing and prototyping

Owing to the completely unknown market and the risk that the target groups are not yet ready for the subject-matter (cooperation with a different industry), the sample case is used to approach the solution by way of prototyping. For this reason, the test phase is particularly intensive in addition to the requirements collection. All in all, an agile approach, i.e. an iterative procedure, plays an important role in the development of complex services. Accordingly, a more detailed investigation of the relationships and an extension of known development models by an agile concept is an interesting starting point for future services research.

Lead user approach and high customer focus

Moreover, close cooperation with lead users has turned out to be useful, particularly in connection with testing a first concept and a first specific offer. This can help to minimise the risk of developing offerings that "miss the market" since future needs are anticipated in time and correctly. Hence, customer focus is not only "glanced at superficially" by a compilation of obvious requirements but ensured by developing more substantial requirements into the service. In this way, customers develop from the passive role of mere informants and objects of study into development partners. Since such lead users want to actively drive the development of innovative products and services themselves, the development project becomes more dynamic and economically more efficient for the service provider. An interesting subject of study in this context is how such lead users are identified and how points of interaction within the development process of a service can be defined and visualised.

Awareness raising and marketing in "early markets"

The model includes the establishment of a marketing concept for the new services in parallel to the development of the service concept. In the case of BioRegio STERN Management GmbH, the focus is predominantly on raising the awareness of the target groups (life sciences and engineering & automation enterprises), most of which first have to be made aware of the advantages of cooperation with the other industry. In this respect, the functions that e.g. business communication, marketing and sales and, in particular, collaboration in close development partnerships with potential customers can take in the development process may also be studied. It should be demonstrated which variation of the development model allows an early push into markets, which do not yet know their own needs. It is also possible to show mechanisms of how experience gathered by lead users can be communicated efficiently to other potential customers in order to facilitate the roll-out of the service in the market.

Interdisciplinarity

The example has shown that the interdisciplinarity requirement can be covered by service offerings, in this case for the collaboration between the engineering and natural scientific disciplines. In the sample case, interdisciplinarity already exists in the service development process. Other research activities could investigate the role of services at interfaces and, on the other hand, optimum compositions of developer teams for services in different areas (e.g. joining designers with natural scientists).

7 Supplementary

7.1 About BioRegio STERN Management GmbH

BioRegio STERN Management GmbH is a skill-sharing network, providing a help and advice centre for founders of new businesses, entrepreneurs and researchers in the life sciences sector in the cities of Stuttgart, Tübingen, Esslingen and Reutlingen and the Stuttgart and Neckar-Alb regions (Baden-Württemberg, Germany). BioRegio STERN Management GmbH represents the interests of these market players in dealings with political circles, the media and associations and provides advice on grant applications and corporate financing. Key focal points include regenerative medicine, medical technology and the automation of biotechnology. Managing Director Dr. Klaus Eichenberg is a molecular and cell biologist and investment analyst.

7.2 Acknowledgements

The results outlined in the present article are based on partial results of the project titled "Clusterinitiative Engineering – Life Sciences – Automation (ELSA)". ELSA is supported by the Ministry of Finances and Economy of Baden-Württemberg with funds from the European Regional Development Fund (ERDF).

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Knowledge intensive sectors in Mexico: An international comparison

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One of the essential components of the knowledge society is the economic role of Knowledge Intensive Services (KIS), which have become engines of economic growth and high quality job creators. However, Mexico's policies have been focused mainly on technological innovations in goods, disregarding service innovations and thus the relationship of technology infrastructure with knowledge intensive services. The paper is exploratory in nature: First, an international comparison of Mexico is made -in terms of employment, value added and productivity- with the USA, France, Spain and Finland, looking at the knowledge and technology intensive sectors. For this purpose national data are aggregated in two sets: goods and services. On the one hand, services which are divided into traditional, intensive knowledge and innovation centered. On the other, goods are divided into manufacturing, which comprises low, medium and high technology. For the remaining goods sectors, mining and construction are included in low tech industries while agriculture is dealt with separately. Finally, considering Mexican's relatively weak economic structure in high technology goods and innovative and knowledge service sectors, this paper outlines a number of insights that could contribute to policies aimed at fostering innovation processes.

Index Terms KIS, Knowledge intensive services, Mexico, International comparisons.

1 Introduction

Schumpeter's approach of "creative -destruction" allows, in a context of crisis, to relate the economic swings to the changes in technology and institutions. So, the innovations involving new products, processes, markets, resources and organizations, complemented by the entrepreneur (the decision maker) are key concepts for theoretical and empirical research. The process of creative-destruction can be analyzed at firm or industry level, as the process of industrial change and renewal is fundamental for economic growth and development. For contemporary societies, the long term process of economic waves of prosperity-recession, and depression- improvement, nowadays results in the development of service economies that is, economies with half or more jobs in services.

To understand the evolution towards knowledge societies, it is necessary to follow up the emergence of the Technology goods and Knowledge service sectors and the decline of different industries over time, along with the commercialization of innovations in their entrepreneurial context. However, in developing countries, besides looking at the evolution of their industries, a comparison is required to detect the gap between these countries and developed nations with respect to the relative number of innovations and their diffusion, as well as the relative awareness of the importance of both technology based goods and knowledge based services.

2 Literature Review

The economic analysis of services and particularly of service innovation is growing and will be more important in the future (Expert Panel European Union, 2011), according to the following evolution stages approaches: assimilation, demarcation and synthesis (Coombs & Miles, 2000). In the assimilation approach, service innovation is regarded as similar to innovation in manufacturing, while in the demarcation approach, which considers that services are different, a specific definition and method is required. Finally, anticipating a synthesis approach, the interrelations between technology and service innovations involve a combination of new and old theories and concepts (Djellal & Gallouj, 2013). Thus, for the emerging integrated approach, the interrelationship between good & services innovations is becoming more important (Omachonu & Einspruch, 2014). It is also important to note that the 'reverse innovation cycle' in contrast to the classical one, explains the innovation stages for consumer services industries, beginning with the efficiency of delivering the service, secondly the process innovation that develops service quality, and thirdly, service product innovation achieved through new kinds of services (Barras, R, 1986).

In order to classify innovation services four dimensions are proposed: service concept, client interface, service delivery, and technology which are related to personal, organizational, marketing and competing capabilities (Hertog, 2000). Another point of view involves considering which services are undergoing most change or being transformed: physical (goods), information, Knowledge-based or people, or stressing intra-services differences in terms of the patterns of technologies used, relevant market characteristics and technical skills required (Miles, 2008).

Different service sectors correspond to different knowledge intensity and R&D input, depending on the supplier. On the one hand, if the suppliers are goods businesses, then R&D services and engineering and computing relate to high innovative intensity; or, other goods could be inputs for a service provider which has a low innovation rate such as land

and sea transport, security, cleaning and other businesses. On the other hand, it is important to know whether the service has a service provider as in the case of technical consultancy, which corresponds to high innovation; or low innovation for example, advertising; banks, insurance; trade, repair of motor vehicles and hotels (Evangelista, Rinaldo, Maria Savona, 2003). Some services participate in the innovation processes as sources or support for innovation, and as agents of diffusion (Miles, 2005).

3 Methodology

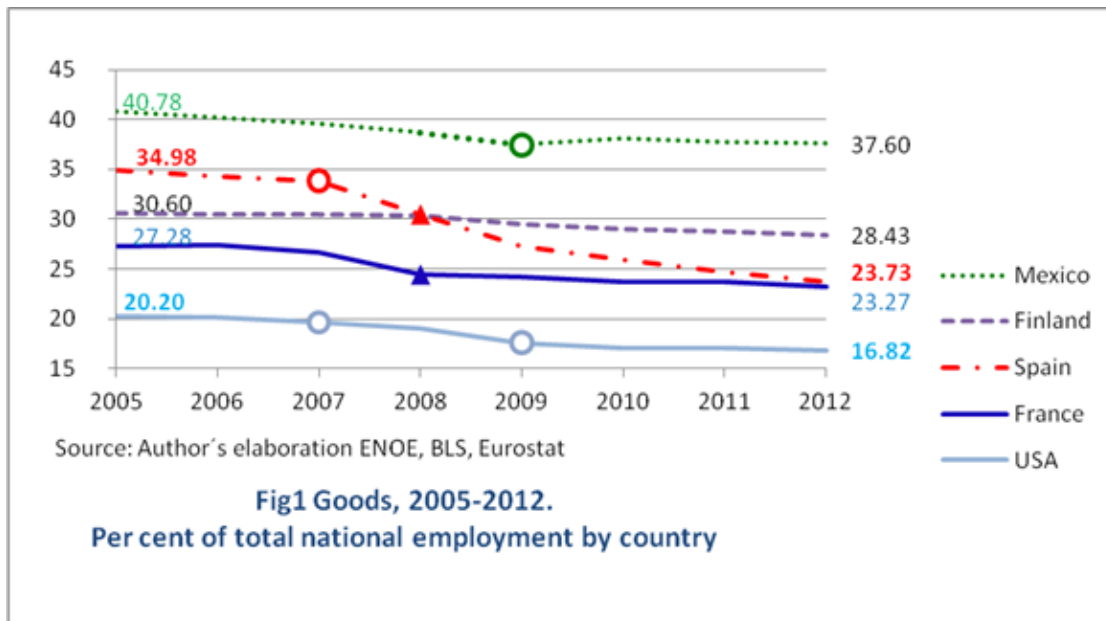
Industries of Knowledge Intensive Services (KIS) are an important to the innovation and progress of modern economies. In order to make a structural analysis of KIS evolution, a general classification is made differentiating between industries which produce services and goods industries (the latter including agriculture, mining, energy and manufacturing). Goods are classified as high (HT), medium or low technology (Annex1). Services are divided into traditional, knowledge intensive and innovation services. Innovations services (IS) are those which generate innovations based on high tech services and highly qualified personnel; knowledge intensive services (KIS) use information intensively, qualified personnel and knowledge in standardized processes based on standard or high tech, but with less innovation. Traditional services (TS) are based on standardized processes and equipment, technology and personnel, but these could also generate incremental innovations (Annex 2). Services are a major challenge to the concept and measurement of productivity (Djellal & Gallouj, 2013).

Based on these aggregated industries, the evolution of relative employment, value added and productivity is presented for Mexico and compared with the USA, France, Spain and Finland.

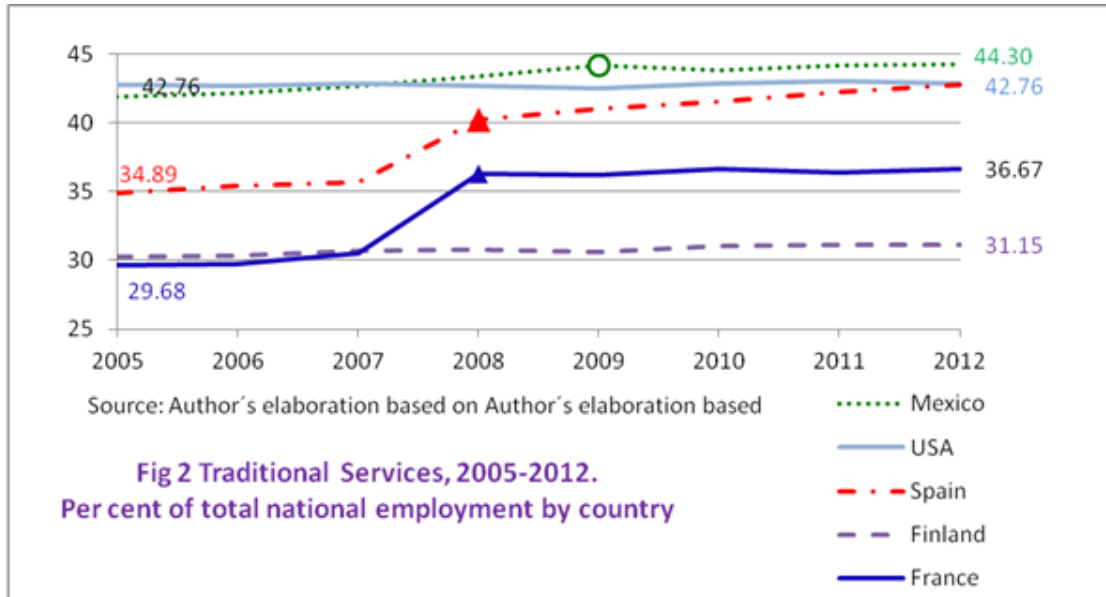
4 Results

In 1950 was the first economy in the world to have more than half of the jobs available in service the service sector thus making it a predominantly service economy. Nowadays, it is the world's largest tertiary economy with an employment level of 85% in 2012. For the same year, the percentage of employment in services for France was 78%, Spain 73%, Finland 72% and Mexico 52%. Therefore, the shift to service employment continues to grow and it is positively correlated with national GDP per capita (Schettkat & Yocarini, 2006) and (Fuchs, 1968).

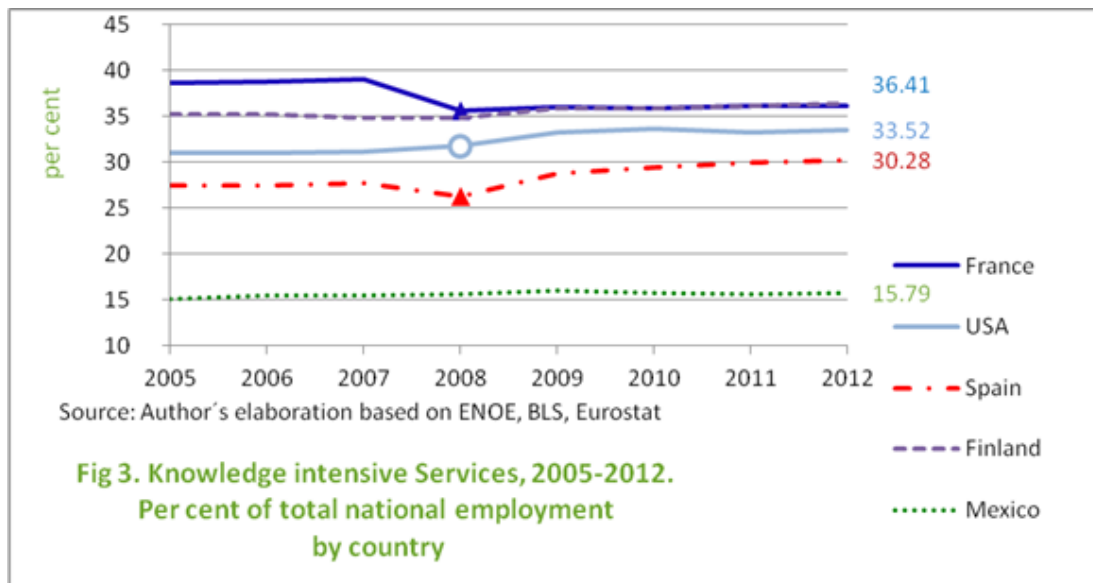
In 2012, the five countries selected showed a diminishing tendency in the goods industries, that is mainly agriculture and manufacturing. Mexico has the highest employment participation in goods, 38%, which is about double that of the USA which has the lowest rate of only 17%. Spain has the highest rate of change, reducing the share of employment in the goods sector from 35% in 2005 to 24% in 2012. This reduction could be due to the impact of 2008 crisis which caused a greater drop in manufacturing and agriculture employment compared with job losses in services. The reduction of employment in the goods industries for the period 2005 to 2012 was 4 points in France, and only 2 points in Finland. (Fig. 1).



In the traditional service sector there is a general tendency for four countries to maintain and converge with a proportion of jobs around 40%. As a matter of fact, all the countries selected are in the range of 37% for France and as high as 44% for Mexico. The USA and Spain are in the order of 43% and Finland has a constant proportion of 31% of the traditional services jobs with respect to their total national employment figures. (Fig. 2).



France has a higher participation of jobs in “knowledge-intensive services” 36%, above that of the USA, which is in second place with 34%. This is due to the fact that France has a higher proportion of jobs in health, education and government sectors. Despite the 2008 crisis, all countries increased their participation in the KIS sector for the period 2005 to 2012: Spain 3%, USA 2.5%, Mexico and Finland have been practically static at 1%. In contrast, France dropped 4 points from 39% in 2005 down to 35% in 2012 (this is partly due to the change in the Eurostat methodology in 2008, see footnote 5) Fig. 3.



In the sphere of “innovative services”(IS), the USA. is the country with the highest proportion of employees, 6.8% in 2012, increasing nearly 1 point since 2005, a fact correlated with research and development activities. Also, the impact of the crisis on employment in this sector has been less than at national level over all, so the participation of this sector increased. The other countries are quite a long way behind the US, in the range of 3.5% for France and 2.3% for Mexico which has an important gap with respect to the other countries. France reveals a tendency to decrease from 4% in 2005 down to 3.5% in 2007, with a large drop to 3% in 2008; later, there is a recovery up to 3.5% in 2012. The USA shows an increase of nearly 1% for the 2005 to 2012 period, with a marked slow-down in 2008 correlated with the crisis. Mexico has a small rise in IS from 2.1% in 2005 up to 2.3% in 2012, while Finland shows no change during this period with a 4% participation in Innovation services (Fig. 4).

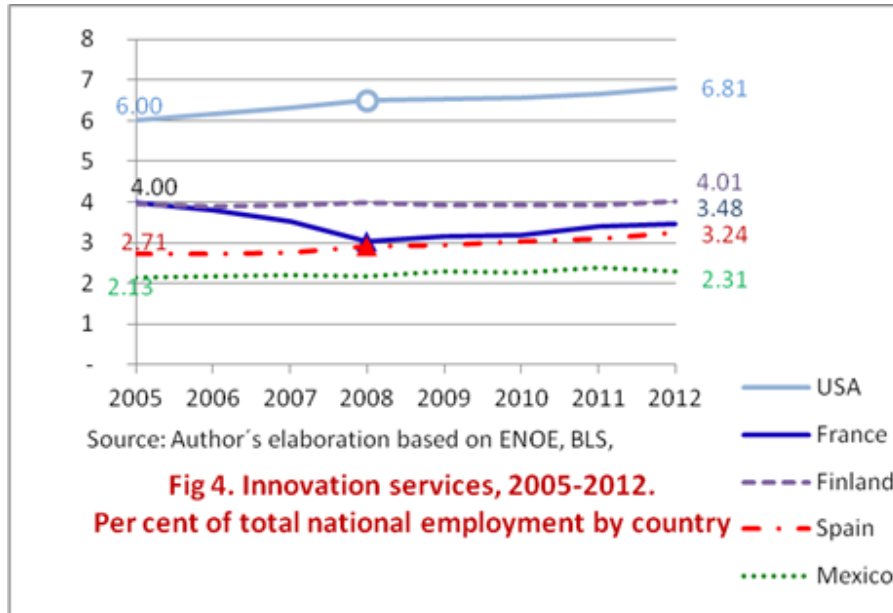


Fig 4. Innovation services, 2005-2012.

Per cent of total national employment by country

Summing up the results (Table 1), the largest negative impact on employment of the 2008 crisis is on the “goods sector” (GS), for all five countries, with an average rate of -7.6%. If we look at each country individually, the largest impact is in Spain (-15.8%), the USA (-12.4%) and Finland (-6.4%). In KS, except for the USA with a slight drop of -0.5%, we can see that for the other four countries there is an increase particularly in Mexico (2.2%) which, in spite of the crisis also shows an important increase in IS (5.9%) and in France (3.9%). In contrast, the IS sector goes down in the USA (-4.3%) and in Finland (-3.8%).

Table 1. Crisis 2008-2009: Employment change in %.

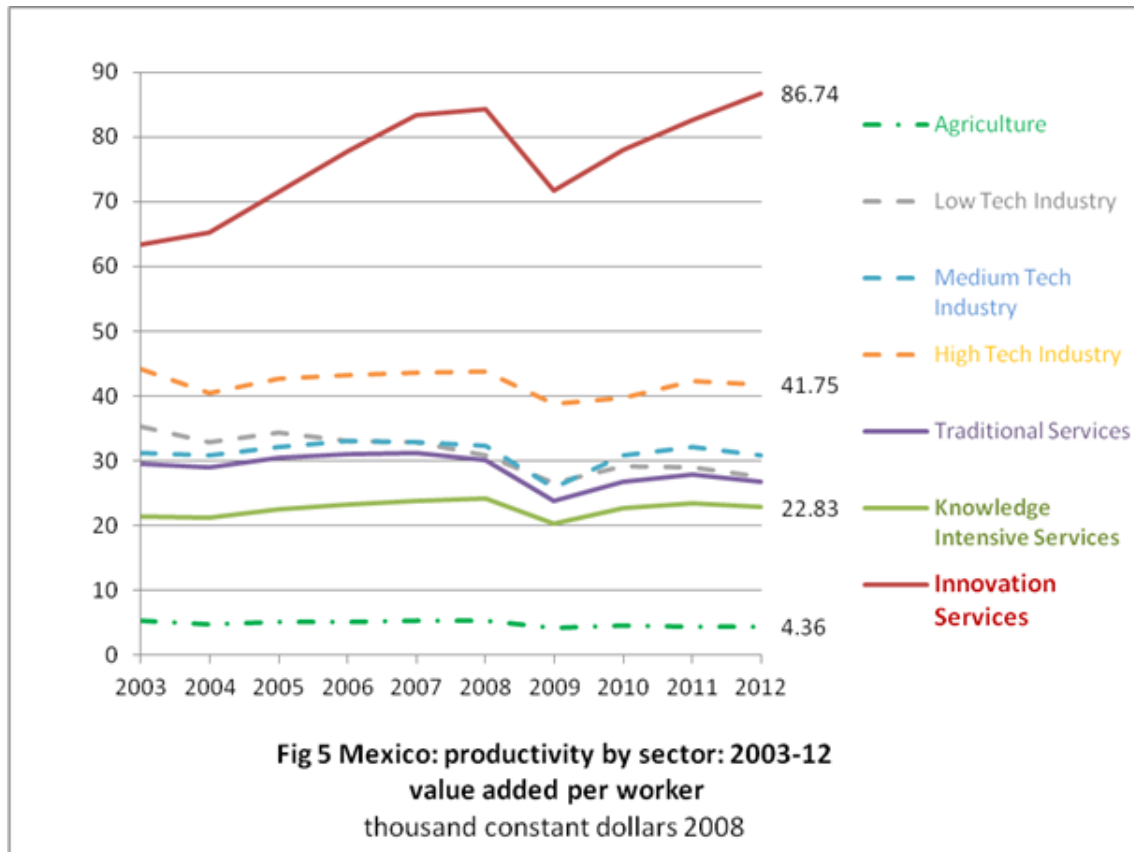
SECTOR	USA	Mexico	Spain	Finland	France	Average
Whole country	-5.12	0.46	-6.8	-2.6	-0.93	-3.00
Good sector, GS	-12.4	-2.82	-15.82	-6.45	-2.16	-7.93
Services	-3.4	2.54	-2.56	-1.31	-0.45	-1.04
Traditional Services, TS	-5.43	2.21	-5.39	-3.08	-1.16	-2.57
Knowledge intensive services; KS	-0.49	2.98	1.93	0.55	-0.09	0.98
Innovative services, IS	-4.31	5.92	-1.54	-3.84	3.86	0.02

Source: Author's based on ENOE, BLS, Eurostat

4.1 Value added and productivity for each country

4.1.1 Mexico

In 2012, Mexico reached 2/3 of the total value added in areas including traditional services (41.5%) and low technology industry goods (24.6%). The remaining 1/3 was generated by the knowledge intensive sector (14.4%), medium tech goods (9.1%), innovation services (5.9%), agriculture (3.9%) and the high tech goods sector (1.4%) which in fact reduced its participation from 1.8% in 2003. However, this sector achieved its highest productivity of 86.4 thousand constant dollars per worker in 2008 and its highest growth rate of 37% during the period 2003 to 2012. The other sectors are far behind with half that productivity, 41.7 thousand for high technology goods industries and nearly a quarter of that highest productivity, 22.8 thousand constant dollars for knowledge intensive services in 2008. In addition, these other sectors remain on a more or less on a constant plateau with respect to productivity. Agriculture is the weakest sector with 4.4 thousand dollars per worker, nearly 20 times less than the highest productivity in innovation services (Fig. 5).

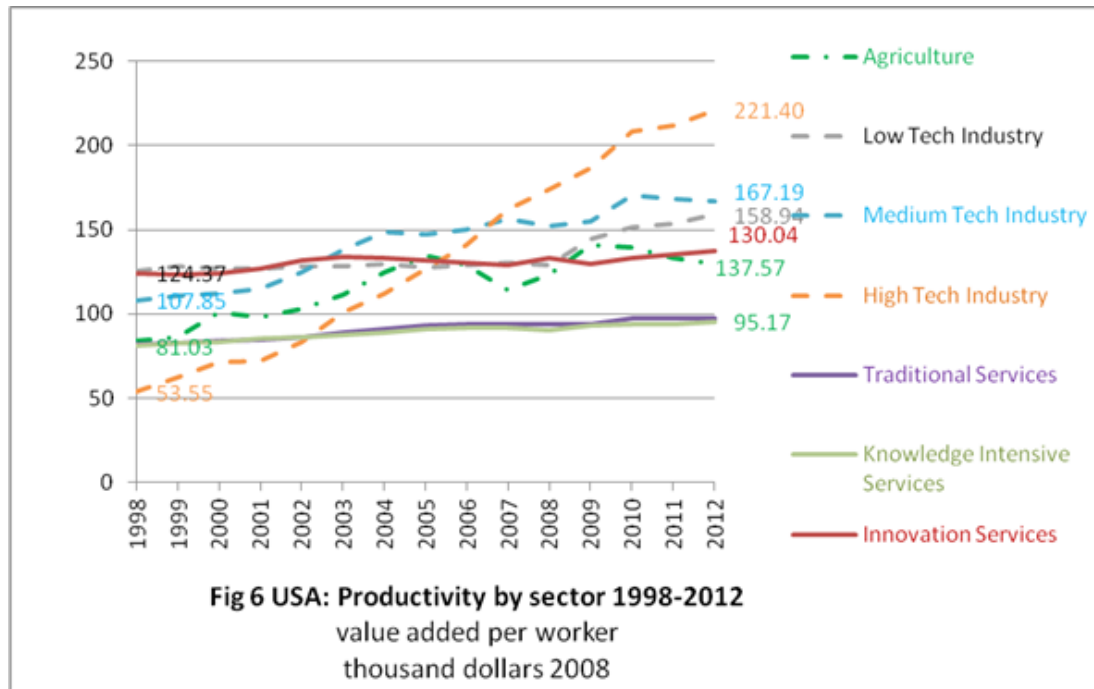


Source: Author's Elaboration based on INEGI (Mex).

So, to explain why there is such a large sectorial productivity gap we need to take additional factors into consideration: 1) the dual economy characterized by a wide gap in agriculture between very low value added activities in seasonal rain dependent agriculture versus irrigation agriculture. There are also divisions in traditional services, i.e. retail commerce, on one hand, the informal market and on the other, modern trade. 2) Mechanisms of value transfer which could explain the productivity gap between innovation services, with productivity in 2012 of 86.7 thousand dollars, and high tech industry with half this level of productivity, that is 41.7 thousand dollars per worker.

4.1.2 United States of America

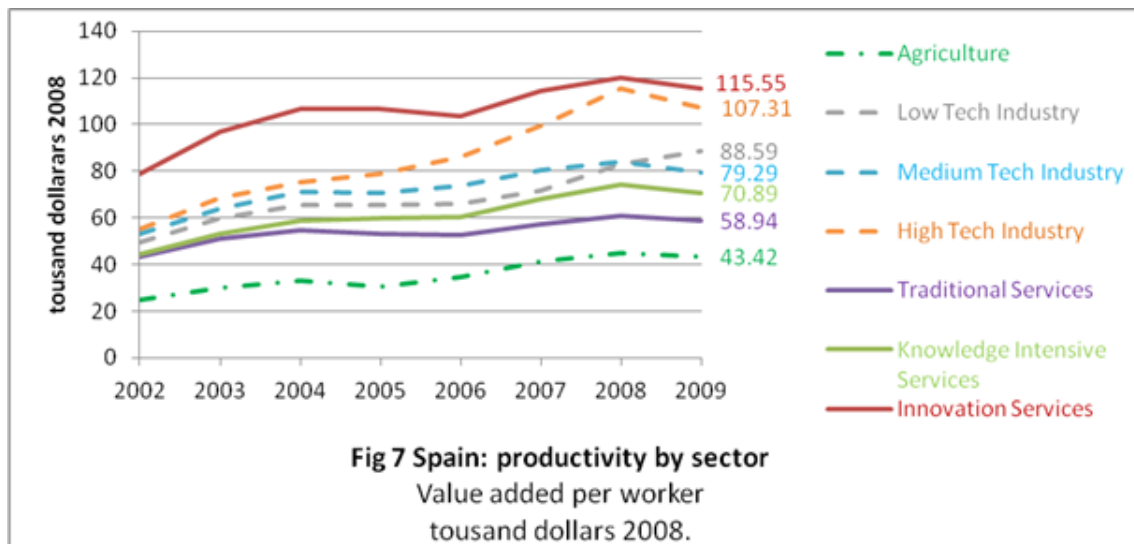
The USA shows 2/3 of its value added in Traditional (35.6%) and Knowledge intensive service sectors (33.1%). The rest is in innovation services (9%) and good industries (22%). For the period of 1997 to 2012, the High Tech goods sector has the highest growth (2.6 points) with Innovation services (0.4) in second place. The other sectors more or less maintain their value added (KIS and Agriculture); and Medium Tech (-2 points) and Low Tech (-4.3) diminish their participation. The productivity range in 2012 is between 221 for High Tech goods and 95 and 98 for Knowledge intensive and Traditional services, respectively, in thousand 2008 dollars per worker. In 1998, Innovation services show a productivity of 124, and High tech goods of 54, in thousand-2008 dollars. That is to say, lower values compared with 2012 and also less pronounced differences between sectors (Fig. 6).



Source: Author's elaboration based on BEA (USA)

4.1.3 Spain

Similarly to the USA, Spain covers 2/3 of its value added with Traditional (36.4%) and Knowledge service sectors (28.9%). The rest is in low tech (20.6%) and medium tech industries (6.9%). For the period of 2002 to 2012, the KIS sector had the highest growth rate (4.5 points) and in second place, Innovation services (0.5). Value added diminishes for the other sectors: Medium Tech (-2.9 points) and Low Tech (-1.3) and falls slightly in high tech (-0.1) and agriculture (-0.6). The productivity range for 2012, is 115 for Innovation services and 43 for Agriculture, in thousand 2008 dollars per worker. In contrast, in 2002 productivity was both lower and with smaller differences between sectors that is, in the range of 79 for innovation services and 25 in Agriculture, in thousand-2008 dollars. (Fig. 7)

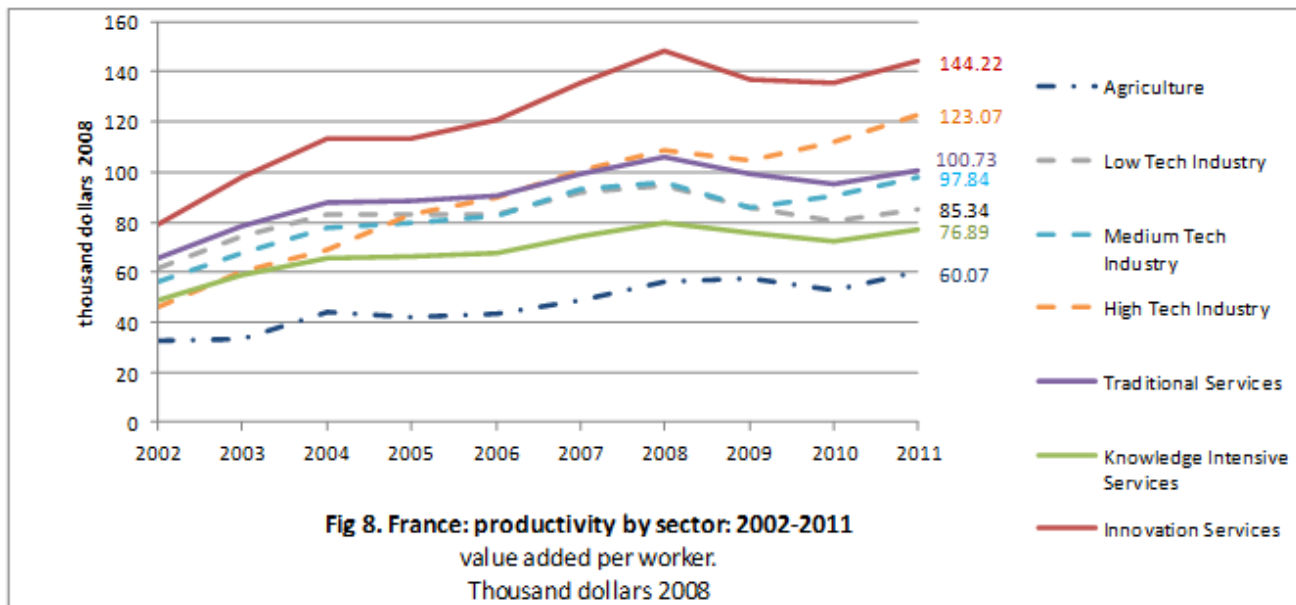


Source: Author's elaboration based on EUROSTAT and INE.

4.1.4 France

By 2011, France covered 3/4 of its value added in Traditional (41.1%) and Knowledge intensive service sectors (33.3%). The rest is in low tech (11.5%), medium tech industries (5.8%), Innovation services (5.3%), and with a small participation in agriculture (1.8%) and high tech industry (1.5%). For the period of 2002 to 2011, the KIS sector has the highest growth rate (4.5 points) with Innovation services (0.5) in second place. The other sectors' value added diminishes: Medium Tech (-2.9 points) and Low Tech (-1.3): and fall slightly in the case of high tech (-0.1) and agriculture (-0.6). The productivity range in 2012 is between 115 for Innovation services down to 43 for Agriculture, in

thousand 2008 dollars per worker. In 2002, productivity is lower, in the range of 79 for innovation services and as low as 25 in Agriculture in thousand-2008 dollars, which is a less pronounced difference than in 2012. (Fig. 8).

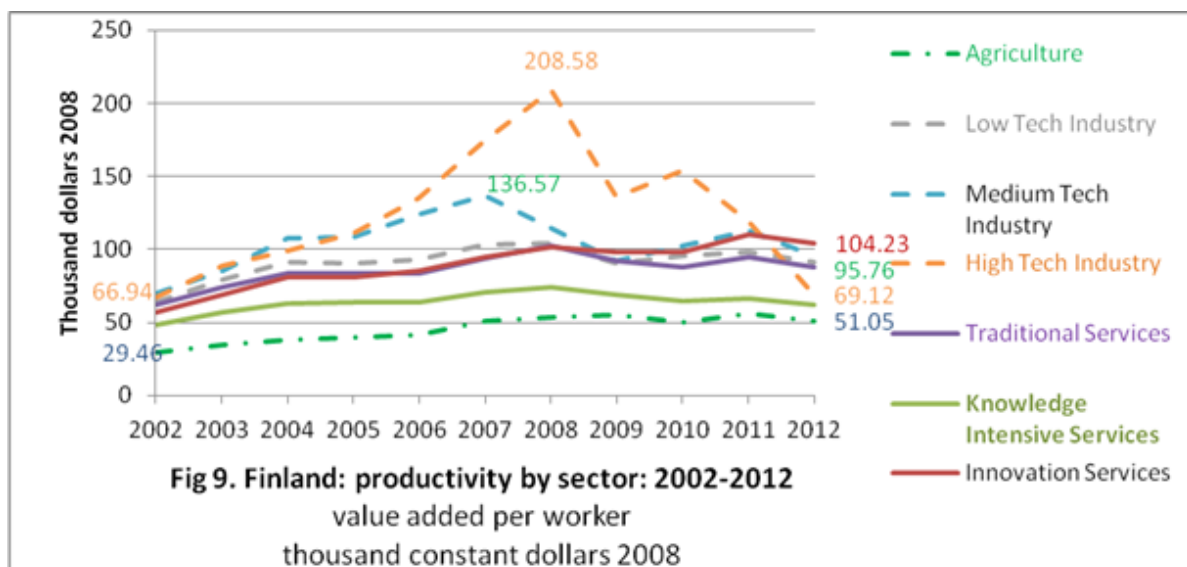


Source: Author's elaboration based on EUROSTAT

4.1.5 Finland

In 2012, Finland has nearly 2/3 of its value added in Traditional (35%) and Knowledge intensive service sectors (28.8%). A quarter of it is in Low tech (16.1%) and medium tech industries (10%). We find the other sectors in decreasing order: Innovation services (5.4%), Agriculture (3%) and High tech industries (1.7%).

For the decade 2002 to 2012, Finland shows a slow change in value added structure, diminishing for the goods industry (-3.1%), and increasing in the case of traditional services (2.6%) and innovation (1.4%) services. However, there are noticeable reductions including high tech (-1.3%) and knowledge base (-1.0%) sectors. Productivity comes full circle in the case of High tech industries as it is nearly the same at the beginning and end of this period (67 vs. 69 thousand dollars 08) with a sound high productivity of \$208 thousand dollars-08 in 2008, alerting to a need to counteract non-positive tendencies to become a knowledge society (Fig. 9).



Comparing the 5 countries selected, productivity per worker is higher in the USA in all sectors, except in traditional and innovative services where France has the highest value added per worker, and is in second place in H Tech and Medium Tech, KIS and Agriculture. Finland is second in Low tech. Mexico has the lowest value added per worker in all sectors. Therefore, in function of their respective national productivity the countries analyzed appear in the following order: USA, France, Finland, Spain, and Mexico (Table 2).

*Table 2. Productivity by sector and country, in value added per worker.
Thousand dollars 2008.*

Country	USA	Mexico	Spain	France	Finland	
SECTOR/year	2012	2012	2009	2011	2012	Average
Whole country	109.9	23.3	69.26	90.03	78.0	74.1
Agriculture	130.0	4.4	43.42	60.07	51.0	57.8
Good sector, GS	166.9	32.8	86.69	91.25	90.9	93.7
Low Tech Industry	158.9	27.6	88.59	85.34	91.0	90.3
Medium Tech Industry	167.2	30.9	79.29	97.84	95.8	94.2
High Tech Industry	221.4	41.8	107.31	123.07	69.1	112.5
Services	99.8	27.6	65.26	90.82	75.3	71.8
Traditional Services, TS	97.6	26.8	58.94	100.73	87.5	74.3
Knowledge intensive services; KS	95.2	22.8	70.89	76.89	61.7	65.5
Innovative services, IS	137.6	86.7	115.55	144.22	104.2	117.7
Author's elaboration base on author's classification (annex1) based on Eurostat for EU's countries and NACE for USA and Mexico statistics.						

4.2 Discussion

As countries moved towards becoming modern societies the services sector increased. However, considering that services are more heterogeneous than goods activities (Howells & Teller, 2004), the literature reports different approaches to classifying services industries (See literature review section). One way is the use the innovation intensity vs. the interactivity axes (Evangelista & Savona, 2003). Choosing only the first axis, innovation intensity, a classification of services in three sectors is proposed: Innovation services, Knowledge intensive and Traditional services (Annex 2). Applying a similar criterion, goods industries are classified into High, Medium and Low technology sectors (Annex 1). The remaining sectors are the primary industries of agriculture and mining. This broad taxonomy in 7 sectors allows a comparison between countries and could position them in terms of their respective structure and dynamics.

However, the approach is limited in the sense that the sectors have different innovation intensities depending on the country being studied. So it is necessary to make adjustments with complementary sector information for each country and a more detailed analysis based on firms' innovations. For example, Mexico's modernization based on maquiladora assembly plants downgraded the content, for instance, of aeronautics, from High to Medium technology. Similar adjustments must be made for each country, an analysis which is not included in this paper.

Conclusions

Changing the structure of goods and services is a slow but sustained process. In the Schumpeter framework an implicit question is that as services are an increasingly important part of the economy as a whole, how integrated goods & services productivity will develop. (Maroto-Sánchez & Cuadrado-Roura, 2009). Up until now there is no clear answer as to how a service-goods production revolution similar to the historic industrial revolution will come about. Thus, analyzing the evolution of knowledge services and technology sectors, some partial understandings could help find a way in the future to really overcome the 2008 economic crisis. Then, the analysis of service innovation is in fact a modest contribution towards that larger goal.

Comparing the selected countries, four have about 2/3 of its value added in Traditional and Knowledge service sectors in 2012: USA (68.7%), Spain (65.3), France (74.4) and Finland (63.8), whereas Mexico achieves it (66.1%) by combining the same traditional services with low tech industries.

The productivity per worker is the largest in the USA for all sectors, with the exception of the highest productivity in innovative services which is highest in France, the country that comes in in second place with respect to High and Medium Tech, KIS and Agriculture. Finland is second in Low Tech. Mexico has the lowest value added per worker in all sectors. Therefore, the countries selected fall into the following order: USA, France, Finland, Spain, and Mexico, in function of their respective national productivity (Table 4).

Finland shows certain stagnation in its sectorial structure, with an important number of businesses in the high tech goods sector shutting down since the 2008 crisis. The lesson is that it is risky to base on economy too much on one tech niche (Nochia).

Mexico is lagging behind the selected countries. Thus a policy of developing internal capacities mainly for Knowledge and Innovative services is urgent.

Annex 1: Agriculture and Manufacturing Industries

Agriculture (Natural Resources and mining)	High-technology industries	Medium-technology industries	Low-technology industries
Agriculture, hunting and forestry (A) [111-113, 115] {A1-A2}	Aircraft and spacecraft (353) [3364] {C30.3}	Machinery and equipment (29), [333 excl. 3333], {C28 excl. C28.2.3, C33}	Mining and quarrying* (C) [21], {B}
Fishing (B) [114] {A3}		Electrical machinery and apparatus (31) [3346, 335], {C27, C26.1}	
	Pharmaceuticals (2423), [3254] {C21}	Transportation Equipment, except aircraft and spacecraft (34, 35 excl. 353), [336 excl. 3364], {C29, C30 excl. C30.3}	Electricity, gas and water supply* (E), [22], {D, E}
	Office, accounting and computing machinery (30), [3333], {C28.2.3, C26.2}	Chemicals excluding pharmaceuticals (24 excl. 2423), [325 excl. 3254], {C20}	Construction* (F), [23], {F}
	Radio, TV and communications equipment (32), [3341-3344] {C26.3- C26.4}	Rubber and plastics products (25), [326] {C22}	Wood, pulp, paper, paper products, printing and publishing (20-22), [321- 323], {C16-C18}
	Medical, precision and optical instruments (33), [3345], {C26.5-C26.8}	Coke, refined petroleum products and nuclear fuel (23), [324], {C19}	Food products, beverages and tobacco (15-16), [311-312], {C10-C12}
		Basic metals and fabricated metal products (27-28), [331- 332], {C24-C25}	Textiles, textile products, leather and footwear (17- 19) [313-316] {C13-C15}
		Other non-metallic mineral products (26) [327], {C23}	Manufacturing, n.e.c.; Recycling (36-37), [3369, 337, 3399], {C31-C32}

Annex 2: Service Industries

Traditional Services (TS)	Knowledge Intensive Services (KIS)	Innovation Services (IS)
Transport and storage (I excl. 642) [48-49], {H}	Education (M), [61], {P}	Telecommunications (642) [517], {J61}
Wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods (G) [42, 44-45], {G}	Health care (N), [62], {Q}	Computer and related activities (72), [5415], {J62}
Hotels and restaurants (H), [72], {I}	Financial intermediation (J), [52], {K}	Professional and technical services (73, 74 excl. 749) [54 excl. 5415], {M}
Real estate, renting (70-71), [53], {L}	Communications & Media (9213), [51 excl. 517], {J58- J60, J63}	Other business activities (749), [55], {N}
Other community, social, personal and private households service activities (O excl. 9213, P), [81], {R, S, T}	Public administration and defense; compulsory social security (L), [92], {O, U}	
() ISIC, Rev. 3.1	(United Nations Statistics Division, 2014)	
[] NAICS 2012	(United States Census Bureau, 2013)	
{ } NACE	(European Commission, 2010)	

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Visiting experiences and behavioural types in cultural audiences: an analysis of two museums in Lisbon

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Audiences of cultural events are subject to diverse kinds of experiences in their exercise, which are determinant to structure their consumption practices and cultural habits. Mapping and analysing visitors' experiences and their visiting styles is thus fundamental to enhance museums' offer.

Drawing on a conceptual framework which identifies four main kinds of experiences in cultural practices – (i) intellectual experience (ii) emotional experience; (iii) social experience; and (iv) recreational experience, the audiences of two museums in the city of Lisbon (Fado Museum and Puppets Museum) are analysed in this paper.

Considering a typology of diverse audience categories (permanent collection, temporary exhibitions, other events), a detailed study of the assessment of different experiences is pursued, with the aim to confront and identify relevant discriminant categories such as socio-demographic characteristics (e.g. age, gender, qualifications, professional status, nationality, residence, previous artistic practices) and cultural habits (considering their visits to other cultural facilities and events). The final aim is to draw some policy-oriented recommendations from this analysis.

Keywords: Museums, Museum experience, Cultural audiences, Cultural experience, Visiting experience, Culture, Lisbon.

1 Introduction: Research problem and context

Audiences of cultural events are subject to diverse kinds of experiences during their cultural practice. These experiences are determinant to structure their consumption practices and cultural habits, and thus fundamental to be understood and worked on the management and programming of cultural venues. Several recent studies have been pointing out the importance of mapping and analysing visitors' experiences and their visiting styles in order to enhance museums offer (e.g. Falk 2009). This literature has been highlighting the existence and importance of several visitor identities within the museum experience and therefore, stressing the importance of analysing and predicting visitors' different behavioural patterns.

This paper aims to analyse the audience of two particular museums in the city of Lisbon, Portugal (Fado Museum and Puppets Museum), crossing the assessments of the quality of the individual experiences declared by their visitors on a recent survey with some of the socio-demographic characteristics of those visitors, their motivations and cultural habits.

The paper was conceived within the scope of a wider study conducted by Dinâmia'CET (Centre for Socioeconomic Change and Territorial Studies, from University Institute of Lisbon) for EGEAC (Lisbon Municipality's Enterprise for Management of Facilities and Cultural Animation). This audience development study, conducted between July 2013 and July 2014, involved a thorough survey to nearly 6000 visitors of cultural venues and events under EGEAC's management. The main purpose of the research study was to better overview and understand visitors' profile for each event and venue, in order to ultimately plan more successful audience engagement strategies in the near future, addressed to both visitors (real) and non-visitors (potential). More specifically, the research focused on the following key topics: (i) Visit and cultural habits (ii) Frequency of visiting (iii) Nature of visit (iv) Reasons and motivations for visiting (v) Visit experience (vi) Communication (vii) Branding (viii) Socio-demographic profile.

As far as the present paper is concerned, it takes a more detailed and focused approach, whereby rather than addressing all these eight topics within all the EGEAC venues and events, we looked solely at the 2 museums (Fado Museum and Puppets Museum) in order to specifically analyse visitors' profile in the light of their museum experience.

Based on literature review, we identified four main kinds of experiences in museum visiting practices: (i) learning (intellectual experience); (ii) emotional (emotional experience), social (social experience) and fun (recreational experience). Drawing on this conceptual framework and considering three different programming settings - (i) permanent collection, (ii) temporary exhibitions; (iii) other events - the research seeks to identify, confront and assess which of the following relevant discriminant features - (i) visitors' socio-demographic characteristics (e.g. age, gender, education level, nationality, artistic practices and professional status) and (ii) cultural habits (social nature of visits, visits to other cultural venues and events) - will mostly influence visitors four main types of museum experience.

After this brief introductory framing of the problem and of the context of the empirical study, the next section will analyse the museum experience at the light of literature and propose an analytical framework based on these 4 kinds of experiences. Section three will sum up the methodological issues of the study, whilst section four will present the main

results achieved and analyse the data in regard to the conceptual framework. A final section will draw some conclusive remarks concerning policy-oriented principles.

2 Museums audiences and museum experience(s): a framework for analysis

Evolving museums in evolving societies: challenging visitors' experiences

In today's post-modern world, museums are constantly redefining themselves to respond to the demands of shifting and complex societies in which they exist. Because of social, economic and political imposing agendas, museums are permanently not only challenged to revise their missions, roles and activities, but are subject to question their own purpose of existence. Since the birth of museums, collections and people have always been at the centre of their identity making, i.e. they are at the core of why museums are and exist. Nevertheless, because of historical circumstances, museums have given dissimilar emphasis to either people or collections, depending on the perspective at the time (e.g. Benhamou, 2011; Towse, 2003). In fact, intense reasoning and debate about museums' *raison-d'être* and the path they should embrace has long since been held within the museum studies community.

In spite of the debate's everlasting nature and complexity, in the last 30 years, 'museums have striven to become more democratic in their structure and more responsive at all levels to the interests of a broad-based public' (Hein 2000:2). In order to be less static and better mirror contemporary society, museums have been encouraged to change and become not only more open and communicative, but more appealing and socially responsible, in compliance with their inherent social nature. As a result, issues such as public access, accessibility and social inclusion could no longer be left unaddressed and key areas, such as education and audience/marketing research, have thus far become crucial factors in museums' success and survival. In other words, visitors and their museum experience have become the prime concern for museums worldwide. By shifting from the presentation of collections to the production of experiences, the emphasis is now placed on what museums enable people to do and in what people want to do in museums.

This new museum democratic approach in making collections more welcoming, accessible and comprehensible to as many people as possible, has been taking place due to a greater awareness of visitors' ever so changing expectations and attitudes towards museums. In fact, visitors today are increasingly expecting a greater degree of involvement and participation in museums. As such, 'it is not enough for museums to present collections and information in a passive way. Museums have to engage interest through active involvement with their users and build on it to achieve their objectives' (Ambrose and Pain 1993:16). Furthermore, today visitors call for a greater variety of experiences within museums, be they intellectual, emotional, social, recreational or educational, for instance. In order to provide these different layers of experience, museums today are embracing a multitude of roles and constantly creating new interpretive frameworks, thus allowing visitors to have multiple readings and different personal meaningful experiences. By offering assorted perspectives on their collections, museums act as mediators, as they encourage visitors to freely interact with objects and pursue their own meanings. It is fundamentally this rich meaningful mediation between the object and the viewer that outlines the relevant and irreplaceable role of the museum in our society.

Marketing Research and Audience Development

One of the resources through which museums found to help grasp the different meaning and decision-making processes and strategies that each visitor employs in its interaction with the museum is marketing research. Aimed at better comprehending and recognizing these processes, the museum studies research community have increasingly been conducting numerous comprehensive audience development studies, which have confirmed that there are indeed differentiated responses to the museum experience. In addition, it was found, that alike regular consumers, not only do museum visitors have similar cultural habits and patterns of behaviour within museums, but they also have individual different needs and motivations for visiting these leisure institutions (McLean 1997). More importantly however, is that museums have learnt that it is those specific personal needs that will shape a person's visiting motivations, which in hand are accounted for ultimately affecting the overall enjoyment and quality of the museum experience (Falk 1992, 2009).

Marketing research is therefore a tool to 'provide information on people's preferences, attitudes, likes and needs to help companies understand what consumers want' (Hannagan 1992:49). As far as museums are concerned, 'understanding the public's interests and concerns, likes and dislikes, needs and wants, is of critical importance in providing successful museums and services' (Ambrose and Pain 1993:16). With such knowledge and insight, museums are then able to 'develop its products accordingly to facilitate the exchange process' (McLean 1997:89). In other words, by helping pinpoint and understand existing discrepancies between what is offered and visitors' wishes that need fulfilling, marketing research has allowed museums to provide improved tailored products and services and give 'maximum customer satisfaction through the most effective deployment of resources' (Hannagan 1992:54).

As reasoned, museums have been striving to be more sensitive and aware to the specific interests of its visitors. The aim is not only to motivate and engage visitors but consequently, to build long-lasting mutually beneficial relationships with audiences. This new approach has allowed audiences to become empowered, as they now have a highly respected saying in what they expect to find, see, learn and experience in a museum. Marketing research is therefore a key tool to help gain new audiences and bridge the gap between museums and the public they serve. This tool is leading museums forward and reinforcing their purpose as institutions that exist for the benefit of society, i.e. the people.

Museum Experience

In order to understand how visitors' characteristics may shape the museum experience, one must also grasp how visitors produce meaning when interacting with objects and what other endogenous or exogenous factors interfere in that same interaction. As Falk and Dierking have pointed out, within a Museum, 'whatever the visitor does attend to is filtered through the personal context, mediated by the social context, and embedded within the physical context' (Falk and Dierking, 1992:4).

Each viewer or visitor is a singular distinct person who has its own personal context. This unique context 'incorporates a variety of experiences in and knowledge of the content and design of the museum. The personal context also includes visitor's interests, motivations, and concerns' (Falk and Dierking 1992:2) and therefore, help to mould what and how an individual appreciates, understands and interprets. In addition, these personal qualities are extremely important because, as the cultural approach to communication has contended, in meaning construction process, shared by a viewer and an object, specific features of both elements interfere and are determinant in the negotiated production of meaning. The message is no longer defined only by the sender (object) but also by the receiver (viewer), who is now regarded as an active and essential element of communication, being at the core of the interpretative equation (See Hooper-Greenhill 1997, 2000). Moreover, this communication theory is supported by a new exciting way of understanding learning: constructivism. According to Hein, this educational theory argues that knowledge is constructed by the learner and therefore, 'both knowledge and the way it is obtain are on the mind of the learner' (Hein 1996:75).

The underlying argument that permeates these theories is that meaning and subsequent knowledge is something that is always personally constructed, which will thus affect the extent of the engagement and enjoyment of the experience. As knowledge is 'always built on, and consolidated with, previous knowledge', visitors tend to engage more when the experience is somewhat familiar, i.e. when it recalls 'directly to an interest or concern that existed before the museum visit' (Falk and Dierking 1992:119-120). This occurs because visitors 'assimilate events and observations in mental categories of personal significance and character, determined by events in their lives before and after the museum visit' (Falk and Dierking 1992:123). It is this personal significance within the visitor's personal context that will ultimately create and mould motivations for visiting or not visiting a museum. The challenge is then set for museums, as 'visitors come with such a broad range of interests and backgrounds that no single recipe for motivating them could possibly apply across the board.' (Csikszentmihályi and Hermanson 1995:37).

As far as the social context is concerned, it is known to also influence a visitor's experience and interpretation (e.g. DiMaggio and Hirsch, 1976, Becker, 1982; DiMaggio, 1987; Bourdieu, 1994; Caves, 2002; Benhamou 2011). The social and cultural background of the visitor, which is linked to his socio-demographic profile (e.g. social class, age, household and gender) plays a significant role in shaping and forging its character. This way, a visitor interprets both as an individual and as a member of a broader community that interprets socially, i.e., as a member of an interpretative community. Finally, the physical setting is also of importance, as the gallery space, 'which includes the architecture and feel of the building' (Falk and Dierking 1992:3), can also strongly influence a visitor's overall museum experience. In fact, the gallery space of a museum, which may be regarded in some instances to be non-neutral at all, can therefore act and become in itself a meaningful exhibition interpretative tool.

An operational analytical framework

As reasoned above, today visitors expect a great range of experiences within museums that they can relate to and enjoy. Being each visitor a person who not only carries individual and social features, but also has personal specific needs and motivations, one could only assume the countless variety of visitor experiences that may take shape and place within the same museum. However, although recognizing the complexity of this reality, when carrying out visitor surveys, researchers have to try and summarize the universe of possible museum experiences into simple few categories for practical and methodological reasons.

As such, we chose to identify and consider four main kinds of museum experiences that people may have within museums: **learning** (intellectual experience); **emotional** (emotional experience); **social** (social experience); **fun** (recreational experience). We regarded the following four categories as unavoidable because we felt they comprised the majority of the reasons given in numerous national and foreign museum visitor surveys. Moreover, they are inspired by the present definition of museums by the British Museum Association: '*Museums enable people to **explore** collections for **inspiration, learning and enjoyment**. They are institutions that collect, safeguard and make accessible artefacts and specimens, which they hold in trust for society.*' (<http://www.museumsassociation.org/fag>).

3 Methodological Issues

As explained beforehand, the present paper focuses on visitors of two distinct Lisbon museums: Fado Museum and the Puppets Museum. Before addressing methodological and technical issues, it is of importance to outline each Museum's history and mission, as well as examine the nature of their collections and activities they promote.

The Fado Museum

Although Fado has over 200 years of existence, Lisbon's Fado Museum only opened its doors to the public in 1998. According to the museum's official website, its mission is to research, gather, document, preserve, interpret, promote,

exhibit and learn about Portugal's most traditional music genre. (<http://www.museudofado.pt>). The Museum aims to celebrate Fado's exceptional value not only as a symbol of Lisbon, but as an art that is deeply rooted in the cultural traditions and musical history of the country. Moreover, it aims to praise an art that shapes and promotes Portugal's cultural identity, both nationally and overseas. This goal was to some extent accomplished in 2011, when Fado was proudly added to UNESCO's list of World's Intangible Cultural Heritage.

Since its opening, the Museum's permanent collection has incorporated items belonging to hundreds of artists, musicians, composers, authors, poets, instrument manufacturers and researchers. These items not only include material objects e.g. music instruments, phonograms, records, clothes and documents (periodicals, pictures, photographs, posters, musical scores), but also immaterial (intangible) patrimony, such as the memories and testimonies of hundreds of personalities that witnessed, played and wrote the history of Fado. It is because music belongs to the realm of immaterial heritage that visitors' interaction and engagement with exhibition contents, via technology, has always been a huge priority and concern for the museum.

In addition to the *permanent collection*, the Museum has developed a vast programme of activities which include regular *temporary exhibitions* (held outside the Museum gallery space in different cultural venues, providing extra visibility and reaching non-regular visitors) and *other events*, which mainly consist of live performances, musical guided tours (available inside and outside the Museum), books and album launches, workshops, presentations and conferences.

The Puppets Museum

Since 2001, the Puppets Museum is located at the *Bernardas Convent*, in Lisbon. However, the Museum was founded long before in 1987, by the *Companhia de Marionetas de S. Lourenço*, a travelling puppet theatre company which had successfully performed both in Portugal and abroad since 1973. Up until today, the Museum continues to be the sole Portuguese institution to feature the history of puppets and puppet theatres companies across the world, in spite of focusing more on Portuguese puppetry traditions and objects.

As such, it dedicates itself to the collection, conservation, research, exhibition and interpretation of different puppet collections (<http://www.museudamarioneta.pt>). By means of exploring multiple collection approaches, the Museum aims to spread knowledge and provide insightful yet pleasurable fun experiences for its visitors. In addition, because it attracts a large number of young visitors, the Museum fosters numerous educational and children's edutainment activities, mostly concerning live puppet shows and museum guided tours⁹⁹.

The Puppet Museum has been progressively acquiring new items for its main permanent collection, which are a depiction of different puppetry practises that derive either from ancient traditions or from modern artistic expressions. These acquisitions have only been possible due to the admirable contribution, help and support of various individuals, authors, collectors and puppeteers, who have donated their collections or personal objects to the Museum. As a result, it now houses one of the most significant and complete collections of Portuguese traditional puppets. In addition, it also comprises an outstanding wide collection of over five hundred African and Southeast Asian puppets and masks bestowed by the famous Portuguese collector, Francisco Capelo.

Besides its *permanent collection*, the Puppet Museum also holds two to three *temporary exhibitions* per year, in a proper devoted gallery space within the Museum. These exhibitions naturally relate to the art forms of puppetry and theatre, which may often be expressed through painting and photography. In addition, the Museum holds several *other events*, which principally include serving as a host to two notorious Lisbon festivals called: *FIMFA - International Festival of Puppetry and Animated Forms (performing arts)*; and *MONSTRA - Lisbon Animated Film Festival (cinema)*. Finally, several performances, conferences and theatre shows also take place occasionally within the Museum.

Survey implementation

The implementation of the survey data collected by questionnaire was held at the Fado Museum and the Puppets Museum in a pre-defined one year period (July 2012 to June 2013), after a pre-test was previously conducted in June 2012. All interviews were conducted face to face by a team of interviewers, following a proportional quota sampling, which is a non-probabilistic technique used to ensure equal representation of visitors in each group.

The questionnaire was held in several languages (Portuguese, English, Spanish and French, depending on the language spoken by the respondent) and situations (when entering the event, during, or when leaving), covering a variety of days and times of the week depending on the programme of activities and events being held at each venue.

A proportional quota sampling method was used to recruit museum visitors, with quotas based on the events' categories defined by the Fado Museum and the Puppets Museum. By applying a quota sampling method where the sample is not chosen using random selection, it becomes impossible to determine the possible sampling error. In addition, it is also not possible to make statistical inferences from the sample to the population. Therefore, as usually

⁹⁹ Although students/children are a considerable part of the museum's audience, visitors that took part in any educational activities were not targeted by this study, due to the fact that it was centered on people that visited the museum voluntarily, i.e. not part of organized groups. This exclusive approach was also adopted in all other surveyed EGEAC's venues and events, including the Fado Museum.

done in this kind of studies, we can't generalize the results and conclusions for the total number of visitors of the two museums.

Sample Design

The control variables underlying the definition of quotas are the events' categories defined by the Fado Museum and the Puppets Museum, which consist of permanent collection, temporary exhibitions and other events (Table 4.1 in Annex IV presents the events included in each of these categories).

In order to calculate the sample size, it was assumed a dispersion of 0.16 for the characteristics of the universe being studied, a 95% confidence level and a sampling error of 3.8%. Considering the Fado Museum population of 49385 visitors, a sample of 423 visitors was obtained. The sample distribution is proportional to the weight of each category previously mentioned within the universe of the Fado Museum public. After collecting the information, we accomplished a sample of 545 subjects and therefore the sampling error decreased to 3.34%. Considering the Puppets Museum population of 12308 visitors, a sample of 411 visitors was obtained. The sample distribution is proportional to the weight of each category previously mentioned within the universe of the Puppets Museum public. After collecting the information, we accomplished a sample of 404 subjects and therefore the sampling error increased to 3.83%.

Distribution of the sample by quotas by event category	FADO MUSEUM				PUPPETS MUSEUM			
	Permanent Collection	Temporary Exhibitions	Other Events	TOTAL	Permanent Collection	Temporary Exhibitions	Other Events	TOTAL
VISITORS -POPULATION	34 117	4 144	11 124	49 385	7 712	2 580	2 016	12 308
Weight of each stratum (%)	69,1	8,4	22,5	100,0	62,7	21,0	16,4	100,0
Sample Design	292	35	96	423	258	86	67	411
Validated	336	82	127	545	216	95	93	404
Fill Quotes (%)	115,3	231,6	132,3	129,1	83,8	110,2	138,0	98,2

Figure 1. Distribution of sample by quotas by event category.

Statistical Reliability

The purpose of this research is to understand whether there is a difference in average terms between the four main kinds of experiences in museum visiting practices, considering three different programming settings - *permanent collection*, *temporary exhibitions* and *other events*. Moreover, it seeks to identify and assess which of the visitors' socio-demographic characteristics and cultural habits mostly influence the identified four main types of museum experience. Each experience was considered the dependent variable, whilst each museum and each socio-demographic characteristic and cultural habit were the independent variables.

Although we are dealing with samples that were not chosen using random selection, which would not allow us to extrapolate the results to the Universe, the data were treated by a two-way ANOVA. The dependents variables are metric and the independent variables are categorical. However, real issues occurred when considering the asymmetric distribution of the variables, the absence of homoscedasticity between groups with unequal sample sizes and the absence of residuals normality. Therefore, the two-way ANOVA model was not suitable.

Thus, the following methods were applied: descriptive statistics, contingency tables with means and standard deviations of the dependent variables, bar graphics (dependent variables standardized with the Museum mean and standard-deviation) and boxplot.

4 Main Results

The main results that were achieved by carrying out a thorough analysis are systematized in this section. As stated before, our aim was to confront the 4 types of experience considered (intellectual experience; emotional experience; social experience; recreational experience) at the light of the following hypothetic relevant discriminant features: on the one hand some visitors' socio-demographic characteristics (e.g. age, gender, education level, nationality, artistic practices and professional status); and on the other hand, some indicators on cultural habits of visitors (social nature of visits, visits to other cultural venues and events).

For both museums, our operative framework for the analysis compared 3 categories of "cultural offers": (i) *permanent collection*, (ii) *temporary exhibitions*; (iii) *other events*. The basis of this analysis is the rating of the 4 kinds of experiences each targeted visitor had. By considering the answers to a specific museum experience question of the questionnaire (see operationalization of the experiment, on the figure presented at annex 1), this data was then crossed

with all the potential discriminant features, which were in turn provided by answers given in accordance to several other questions of the same questionnaire.

Global general results

Global comparative analysis, without the consideration of discriminant variables can be consulted on figure 2. Some of the main features of the analysis can be outlined as follows.

All 4 kinds of experiences picked up high marks in all the cases considered (3 types of events in each museum). As such, they show small distinctions among them, with scores mostly concentrated at the top of scale (4-5), and with means between 3.2 and 4.3. The overall results show just one outlier: the social experience on temporary exhibitions on Fado Museum, which was rated 2.76. Despite differences not being too relevant in general, it is still worth to perform a more in-depth analysis in the next section.

Fado Museum has more variability of results than the Puppets Museum. It is particularly noticeable when considering the *Temporary Exhibitions* in Fado Museum, which recurrently reports lower scores. This can be explained by the fact that these exhibitions are held outside the premises of the museum, in central touristic places, thus attracting less frequent audiences.

The *emotional* experience is generally the most valued kind of experience, with the exception of the Puppets Museum's *Permanent Collection* and the *Temporary Exhibitions* at the Fado Museum, where the *fun* experience overrates it. *Fun* and *intellectual* experiences (with diverse patterns) are usually the 2nd and 3rd most rated kinds of experiences, within the different kinds of events, on both museums. The *social* experience is regularly the one that is considered the least important, with lower mean scores.

As far as the *intellectual* experience is concerned, the results reveal a dichotomy: although it scored higher marks in the Fado Museum's *permanent collection* and *other events*, in the Puppets Museum, however, the high scores were registered on the *Temporary Exhibitions*, which can be explained perhaps by the exceptional quality of their contents.

The *emotional* experience is consistently more prized on the Puppets Museum than in the Fado Museum, which can be eventually seen as relatively natural due to the nature of the collection and exhibitory devices of each museum (although this can be arguable).

Although the *social* experience is, as mentioned, the less valued experience on both museums, its importance differs considerably when it comes to the *Temporary Exhibitions*: it rates as the worst experience in the Fado Museum (2.79), but improves to a much better (3.4) average on the Puppets Museum.

Lastly, the *fun* experience seems consistently more cherished on the Puppets Museum too.

The next sub-sections will examine the results of our specific analysis, in order to try and find significant differences considering the several discriminant variables. It should be noted that many other variables dealt with in the survey could be used in a similar analysis (e.g. professional status, expressed motivations for the visit, recurrence of the visit), but they are not to be taken into account in the specific scope of this paper, bearing in mind its particular conceptual framework. However, some of them were yet tested, without convincing results. A full analysis of these crossings can be developed in future opportunities.

Figure 2. Degree of importance of each kind of experience assigned to the event, by event category (Global Results) (from min=1 to max=5).

Degree of importance assigned to the event	FADO AND PUPPETS MUSEUMS			FADO MUSEUM									PUPPETS MUSEUM								
				Permanent Collection			Temporary Exhibitions			Other Events			Permanent Collection			Temporary Exhibitions			Other Events		
	Nº	Mean	Standard-deviation	Nº	Mean	Standard-deviation	Nº	Mean	Standard-deviation	Nº	Mean	Standard-deviation	Nº	Mean	Standard-deviation	Nº	Mean	Standard-deviation	Nº	Mean	Standard-deviation
Learning (intellectual experience)	921	3,90	0,85	327	3,98	0,79	79	3,39	0,97	120	3,97	0,93	214	3,88	0,86	93	4,09	0,75	88	3,85	0,78
Emotional (emotional experience)	923	4,07	0,89	325	4,01	0,95	79	3,57	1,01	122	4,24	0,81	215	4,08	0,84	93	4,20	0,82	89	4,34	0,67
Social (social experience)	894	3,26	1,20	312	3,17	1,20	75	2,76	1,22	121	3,60	1,12	212	3,32	1,23	86	3,40	1,33	88	3,26	0,93
Fun (recreative experience)	919	3,93	0,96	323	3,75	1,02	78	3,6	1,05	120	3,96	0,95	215	4,18	0,81	92	4,11	0,97	91	4,09	0,83

Grey shading - there are no differences in the average importance given to events, by age groups

Orange shading - the average importance given to the events in this age group is different from others

Crossings with socio-demographic variables

- Gender

Crossing results between the importance assigned by visitors to each kind of experience (by event category, in both museums) and gender can be observed on the tables and figures presented on section II.1, on Annex II. The differences registered between male and female genders are not very relevant. Some slight differences do exist in particular cases (e.g. women rate *learning*, *emotional* and *fun* experiences higher than males on *other events* in the Fado Museum), which could be more related to programming and sampling issues than to specific gender traits. *Social* experience data shows slightly greater differences (particular in temporary exhibitions), as male results are more expressive in several types of events. Overall, the Puppets Museum displays less consistent gender differences than the Fado Museum, as far as the assessment of the experiences are concerned.

- Age

Crossing results between the importance assigned by visitors to each kind of experience (by event category, in both museums) and age can be observed on the tables and figures presented on section II.2, on Annex II. Again, the results are quite similar and not very striking. The pattern of results between age groups seems to be not very diverse, and when differentiated, they seem to be related to each specific type of event, which in turn, influences in a consistent way the different kinds of experiences. In effect, just three things can be outlined: (i) the *temporary exhibitions* in Fado Museum represent (again) an exception (with progressive relative valuations with age); (ii) extreme age groups (younger and older) show higher evaluation standards across the board concerning the Puppets Museum; (iii) the *social* experience, at large, once again, registers more fluid and diversified results (by age) for the different kinds of experiences.

- Education level

Crossing results between the importance assigned by visitors to each kind of experience (by event category, in both museums) and educational level can be observed on the tables and figures presented on section II.3, on Annex II. Once more, the results are not significantly diverse amongst the different educational level groups. Although we could expect, based on the literature review, that educated groups (with higher cultural capital, by proxy) would highly value the *learning* experience, these differences were not consistently found, as this type of experience seems to be homogeneously acknowledged across educational levels. On the other hand, as expected, *emotional* and *fun* experiences assessments seem to consistently decrease as the level of education rises. Lower levels of qualifications declare consistently higher levels of assessments for these kinds of experiences, particularly on the Puppets Museum. The *social experience* (across the board) and *temporary exhibitions* (especially the Fado Museum's ones), once more, revealed more inconsistent and disperse results.

- Nationality

Crossing results between the importance assigned by visitors to each kind of experience (by event category, in both museums) and nationality can be observed on the tables and figures presented on section II.4, on Annex II. This could be an interesting distinctive indicator, as tourist audiences are considerably large in both museums and are one of the most discriminant variables in many of the other survey questions. However, the results are not conclusive at all, with very similar patterns amongst Portuguese and foreign visitants, concerning their valuation of experiences. With the exception of some sporadic cases (probably related to sampling issues), such as the higher assessment of *fun* on the Puppets Museum's *other events*, there are no consistent differences. Once more, only on the Fado Museum's *temporary exhibitions* is the average importance given to the events by the two groups more different.

- Place of Permanent Residency

Crossing results between the importance assigned by visitors to each kind of experience (by event category, in both museums) and place of permanent residency can be observed on the tables and figures presented on section II.5, on Annex II. This indicator complemented the previous one by distinguishing tourist audiences from the people residing in the city of Lisbon and its suburban areas. Once again, the results are not distinctive at all, showing very similar patterns amongst the 3 groups of visitants, concerning their valuation of experiences. Only the Fado Museum's *temporary exhibitions* seem to, more than often enough, present more distinctive patterns. This fact may be related to the specific features of these audiences, since they were surveyed outside the conventional museum space, and are therefore, presumably, less likely to be the usual Fado Museum public.

- Artistic practices

Crossing results between the importance assigned by visitors to each kind of experience (by event category, in both museums) and previous contact with artistic practices can be observed on the tables and figures presented on section II.6, on Annex II. It could be assumed that people with previous regular personal contact with artistic practices (people

who have studied, practiced or have been engaged in any form of artistic activity during their lives) would have more distinct assessments regarding their experiences, than other subjects questioned. However, again, differences are not quite substantial at all. On the Fado Museum, “non-artistic” subjects have slightly greater *fun*, *social* and *emotional* experiences, particularly on *other events*, whilst they rate worse the learning experience in *temporary exhibitions*. On the Puppets Museum, people with artistic backgrounds seem to slightly overrate *learning* and *emotional* experiences, whilst “non-experts” slightly overrate *social* and *fun experiences*, comparatively.

Crossing with cultural habits of visitors

- Social nature of visits (accompanied or not)

Crossing results between the importance assigned by visitors to each kind of experience (by event category, in both museums) and the fact of being accompanied or not during the visit can be observed on the tables and figures presented on section III.1, on Annex III. These results are a little more enlightening than most of the previous ones, although once more, they display differences that cannot be considered very relevant. In effect, naturally, visitors tend to highly value the *social* experience when people are accompanied, in all types of events. A similar increase occurs regarding the *fun* experience, but solely in the case of *other events* on the Fado Museum. In contrast, *fun* experiences decrease in the Puppets Museum’s *temporary exhibitions*, when accompanied. Results on the *emotional* experience are not too consistent either: whilst in the Puppets Museum there are no significant differences, in the case of the Fado Museum, results seem to improve when people are alone, in both kind of exhibitions, but worsen, when alone in the *other events*. Finally, the *intellectual experience* tends to be, in most cases, a little bit more valued if people visit alone.

- Visits to other cultural venues and events

Crossing results between the importance assigned by visitors to each kind of experience (by event category, in both museums) and the cultural place(s) most frequently cited as the most important in Lisbon (used as proxy of visiting other venues) can be observed on the tables and figures presented on section III.2, on Annex III. These results are not very easy to assess, as it concerns an open multiple answer question (here we just reproduced the most popular ones in each case) and the variable seems not to have a considerable discriminant capacity. There are no clear patterns that can be easily defined by these results. However, an interesting result worth mentioning is that two most universally cited cultural places (Centro Cultural de Belem and Fundação Calouste Gulbenkian) seem to present more distinct evaluations from the rest, as far as the *intellectual* experience is concerned. The difference between people that rated other (less cited) cultural places and the two above mentioned venues, seems to be bigger in the *intellectual* experience, which may indicate the existence of specialized audiences with more discriminant capacity.

5 Conclusions

This paper intended to examine and analyse the audiences of two particular museums in the city of Lisbon, Portugal (Fado Museum and Puppets Museum), by correlating the assessment of the quality of each visitor’s individual experience, with some of its socio-demographic characteristics, motivations and cultural habits. Four types of visiting experiences were considered on this study: (i) *learning* (intellectual experience); (ii) *emotional* (emotional experience), *social* (social experience) and *fun* (recreational experience).

Our purpose was to empirically test some of the most spread conceptual developments on museum audiences, which made us expect that the various types of experiences considered would vary significantly in response to the different kinds of events that took place in each different museum. To see which features would mostly influence visitors’ experience and why, we took into account not only the socio-demographic characteristics of those visitors (gender, age, educational level, nationality, local of residency, and previous artistic practice), but also their motivations and cultural habits (social nature of visits - accompanied or not; and visits to other cultural venues and events).

However, the differences that were found are much less visible than what we expected, considering the literature. In fact, all museum experiences are generally very well rated and so the differences in numbers are quite narrow. In addition, is it especially striking that the average grades are not even transversally consistent amongst the categories analyzed. As such, the discriminant variables were not so discriminant as we anticipated.

Some of the outcome results may even represent significant challenges towards some conceptual approaches on museum audiences. For instance, the low variability of the intellectual experience’s rating in regard to cultural capital (measured by the educational level) contradicts a somewhat commonplace expectation that higher educated visitors expect foremost an intellectual experience within museums. Many assumptions could be made as to why this is so, either because people, regardless of their cultural capital, feel compelled to say what they think might be the most *correct and socially approving* answer and/or because museums are in fact changing and being less elitist in their nature and approach towards the public.

On the other hand, however, as expected, visitors with lower educational levels seem to value more fun and social linked experiences. As reasoned, even these examples, shaped by the particularities of specific events and settings, express very slight differences, and so we have yet to further explore many other links and meanings and try to shed some more light into the matter in future museum experience research work.

As far as the differences between the 3 types of events or programming settings are concerned, they are more expressive and relevant in the Fado Museum than in the Puppets Museum, which present to be more homogeneous. Fado Museum shows more distinct results not only because events are more diverse in nature (including concerts, openings, guided visits, inside and outside the museum facilities), but also especially because temporary exhibitions were held outside the museum in other Lisbon's cultural locations and thus more keen to attract tourists or occasional visitors. These factors are likely to have been the main reason why visitors rated their experience slightly more unevenly, rather than because of the contents of the events themselves.

In terms of policy and action-oriented principles, these results make us aware of the need to deepen our audiences' analysis, making clear that we should progress towards the disentanglement of these "black boxes" in their functioning and to be a little more doubtful on some apparent long-term consensus on these audiences' mechanisms.

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Innovation in Brazilian landfills: A ServPPIN perspective¹⁰⁰

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This paper is devoted to the discussion of public services innovation in the Brazilian municipal solid waste sector, with emphasis on multi-agent participation within Clean Development Mechanisms (CDM) projects. The empirical context is based on six landfill CDM projects located in the São Paulo Metropolitan Area, Brazil. CDM projects have a dual purpose: reducing GHG emissions and promoting local sustainable development in host countries – through the promotion of local co-benefits. The discussion is based on the analytical model provided by the ServPPIN concept (public-private innovation networks in services). It focuses on the characterization of the landfills selected and on the identification of the stakeholders involved within these landfills, pointing out the participation gaps. The results indicate that the participation of associations and cooperatives surrounding landfills is still marginal. Pulling this theoretical (ServPPIN) and empirical research (landfill CDM project) together, one can identify the main factors affecting the establishment of basic conditions for service innovation: a) interactions and the building of social relations aimed at innovation among various stakeholders; b) the development of competences on several fronts; especially relational and organizational; c) the role of the public sector (mainly the coordination role) in supporting the development of successful public-private innovation networks in services.

Keywords: ServPPIN; public service innovation; clean development mechanism; solid waste sector; landfill.

1 Introduction

This paper is devoted to the discussion of public services innovation in the Brazilian municipal solid waste sector, with emphasis on multi-agent participation within Clean Development Mechanisms (CDM) projects. The empirical context is based on six landfill CDM projects located in the São Paulo Metropolitan Area, Brazil. It comprises 39 municipalities, and approximately 20 million inhabitants, generating around 16 thousand tonnes of solid waste per day (Cetesb, 2013).

The discussion is based on the analytical model provided by the ServPPIN concept (public-private innovation networks in services) (Gallouj and Weinstein, 1997; Bučar et al., 2013; Djellal and Gallouj, 2013; Gallouj et al., 2013; Labarthe et al., 2013). Beyond the relational aspect (interfaces and feedbacks) among various public and private actors, the ServPPIN concept emphasizes third sector organizations' (associations, NGOs etc.) participation in different ways. It highlights the important institutional and regulatory role of the public sector, decisive in the success and sustainability of the network; and it points out the importance of non-technological innovation.

CDMs encompass activities aimed at reducing greenhouse gas (GHG) emissions by establishing projects across a wide range of sectors, including landfill sites. In line with article 12 of the Kyoto Protocol, these projects must also contribute to promoting sustainable development in their host countries, through the establishment of local social and environmental co-benefits. Although the CDM projects have a dual purpose (reducing GHG emissions and promoting local sustainable development in host countries – through the promotion of local co-benefits), the United Nations Framework Convention on Climate Change (UNFCCC) does not establish indicators to evaluate social and environmental co-benefits.

According to the Marrakech Accords (Decision 17/CP. 7) the responsibility for determining whether a CDM project activity contributes to sustainable development is defined by the host country and resides with its Designated National Authority (DNA) (UNFCCC, 2001). The Letter of Approval (LoA), a document which confirms that the project contributes to the sustainable development of a particular country, is issued by the DNA and is exclusively based on the objectives of local contributions to sustainable development, as set out by the proponents of the project.

In Brazil, the specifications of a project in order to promote local sustainable development are based on information from Annex III of Resolution n.1 of the Inter-Ministerial Commission on Global Climate Change¹⁰¹. This establishes both the benefits to the local area and how project activities contribute to each of the following aspects: environmental sustainability; improvement in working conditions and net job creation; income distribution; training and technological development; and finally, regional integration and working in conjunction with other sectors (Brazil, 2003). However, analyzes performed on the promotion of local development, based on the CDM projects in the solid waste sector, indicate that most of the projects do not contribute significantly to the achievement of local sustainability (Sutter;

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¹⁰¹ Inter-Ministerial Commission on Global Climate Change is the Designated National Authority (DNA) in Brazil.

Parreño, 2007; Siebel et al., 2013). In this direction, the importance of civil society's effective participation throughout the approval process of a CDM project is noticeable.

CDM projects are not implemented with the explicit goal of promoting service innovation; however, these projects can create leverage and open new possibilities to improve services related to urban solid waste, converging with the National Policy on Solid Waste (Brazilian law nº 12,305/2010) requirements and social and environmental co-benefits generation from carbon market projects.

In this manner, there is need for the development of activities which focus on the steps for generation and treatment of solid waste, preceding the final disposal of waste, searching for alternatives to reduce the generation of waste, encouraging actions for reuse, recycling, and treatment.

Besides these, landfill CDM projects can improve management practice during the operation of landfills (air pollution, groundwater contamination, biogas management, visual, freight vehicle access arrangements, etc) as well as improve on activities carried out after landfill closure, in order to fulfil with the closure plan of the landfill area (maintenance of the vegetation, landfill cover system etc.).

Activities carried out in the projects developed in landfills involve various agents: concession-holders responsible for managing the landfill and capturing landfill gas (LFG); municipal departments; and representatives of associations from the communities surrounding the landfills. The importance of civil society's effective participation throughout the approval process of a CDM project cannot be overstated. Indeed, project proponents should send letters of invitation to all project stakeholders. The following agents should be considered in the case of Brazil: local authorities and chamber of deputies for all municipalities involved; municipal and state environmental departments; NGOs and social movement forums; community associations both directly and indirectly involved in project activities; and State and Federal Public Prosecution Offices.

In this context, this paper intends to analyze how the promotion of local co-benefits is linked to the promotion of innovation in urban solid waste services, emphasizing the participation of civil society, highlighted in the Kyoto Protocol and in the ServPPIN concept. The paper is structured into four sections. Following the introduction, section 2 discusses the public services through the ServPPIN concept¹⁰², focusing on the multi-faceted and heterogeneous nature of the public sector and on the role of the civil society in innovation in public services. Section 3 is devoted to the presentation of empirical cases, focusing on the characterization of the landfills selected and on the identification of the stakeholder involved with these landfills, pointing out participation gaps, taking into account the following criteria: consultation, benefits, and interaction/interface. Our conclusions are set out in section 4.

2 ServPPIN concept and the role of the civil society in innovation in public services

The purpose of this section is to present: 1) specific characteristics of public sector and public service innovation; 2) the concept of public-private innovation networks (ServPPIN), highlighting the importance of multiple links and feedbacks between the public and private sectors, and also with service users and; 3) the role that third sector organizations/end users (citizens) have to play in the ServPPIN context.

Innovation in Public Services

There is an increasing scientific literature on innovation in the public sector. However, the literature generally neglects or underestimates the role of the public sector in the innovation process (Djellal et al., 2013; Windrum; García-Goñi, 2008; Brandão; Bruno-Faria, 2013; Osborne; Brown, 2013).

The public sector is often portrayed as a facilitator of innovation activities, merely drafting the legal framework, among other actions which do not include a leading role in the innovation process (Gallouj; Weinstein, 1997; Mulgan; Albury, 2003; Hartley, 2005; Halvorsen et al. 2005; Koch; Hauknes, 2005; Windrum; García-Goñi, 2008; Potts; Kastle, 2010; Fuglsang, 2010; Sundbo, 2013; Djellal; Gallouj, 2013; Djellal et al. 2013; Osborne; Brown, 2013).

Although the idea has long been prevalent that public services are produced, predominantly, by the public sector, more recently there is improved clarity that public service provision generally involves a more complex and broad range of actors and institutions: public services can be provided by public actors, private actors, or both (Di Meglio, 2013). In this manner, systematic efforts will be required to foster innovation in the public sector (Bloch; Bugge, 2013), and, therefore, in public services.

Djellal and Gallouj (2012) highlight the importance of public services according to the output produced by these services, which can be called social or civic outputs. According to the authors "These 'outputs' contribute to social cohesion, solidarity and collective and civic identity" (p. 11).

Another aspect of public service provision is the difficulty of identifying and demarcating activities that should be attributed to the public sector as opposed to the private sector, as many services and activities in the public sector are integrated with the activities of the private sector and vice versa (Bugge et al., 2010; Potts; Kastle, 2010). This aspect is observed also for services related to municipal solid waste that generally is carried out through concessions to the private sector.

¹⁰² This concept was developed in the ServPPIN project funded by the European Commission. The main results of that project are published in Gallouj, Rubalcaba and Windrum (2013).

According to Bugge et al (2010) and Bloch and Bugge (2013) the multi-faceted and heterogeneous nature of the public sector is a result of the multiple interfaces which characterize public organizations: 1) the interface with the private sector; 2) the interface between the public sector and citizens; and 3) the internal interfaces within the public sector (between government levels and between different areas of activity). These various interfaces, illustrate public sector heterogeneity, and also the permeability between organizations (private, public, and third sector) (Gallouj et al., 2013).

Having outlined the characteristics of multiple interfaces and heterogeneity of the public sector, the public-private innovation networks in services (ServPPIN) concept can be useful in understanding the logic of public service innovation.

Public-Private Innovation Networks in Services (ServPPIN)

One of the factors encouraging interest in examining Public-Private Innovation Networks is the growing recognition of the important role played by public sector organisations in the innovation process. Public administrations are thus no longer restricted to playing a supporting role in the innovation process. They may be active participants in that process, particularly insofar as their own activity is concerned.

Just like public-private partnerships (PPPs), ServPPINs are networks of collaborative partnerships between public and private organizations. However they are more comprehensive, open and flexible than traditional PPPs, which entail relations between actors that are more rigid, with predefined functions, rules and formal procedures (particularly contracts) that can bureaucratize the process, and limit the potential for innovation.

The high number, and diversity, of participants in a ServPPIN can lead to a complex and intensive process of interaction in which a large amount of heterogeneous information and knowledge (tacit and non-tacit) are likely to be exchanged, since plenty of channels are opened for interaction. In other words, ServPPIN can be thought of as a multi-agent service relationship system (Djellal and Gallouj, 2013).

The innovation network¹⁰³ concept is biased towards manufacturing and technology. This concept, in the traditional sense, suffers from a certain number of shortcomings; namely: a technology bias (with largely predominance of tangible technological innovation), a manufacturing bias (linked to the previous one), and a market bias (the private sector is central to innovation dynamics). This means in short that innovation networks are mainly focused on technological innovation produced by the collaboration of private actors in the manufacturing sector.

The ServPPIN concept provides a way of overcoming these various biases (Djellal and Gallouj 2013; Gallouj et al., 2013; Labarthe et al. 2013, Windrum, 2013). It goes beyond the technologist view of innovation¹⁰⁴. Its perspective is broader, incorporating non-technological types of innovation such as: organizational, ad hoc (defined by Gallouj and Weinstein [1997] as the interactive solution to the specific problems of particular clients), social, and bricolage innovation (defined as innovation through non-programmed activities, trial-and-error processes and adaptation to random events – [Fuglsang, 2010]).

Through the ServPPIN concept, Gallouj et al (2013) emphasize the importance of multiple links and feedbacks (interfaces) between public and private sector, and also with users – in our case, representatives of associations from the communities' surrounding landfills – and policy makers for service innovation. As pointed out by Djellal and Gallouj (2013):

ServPPINs are multi-agent service relationship systems. The actors involved in interaction have to deal with the ill-defined nature of their respective products, their non-stockability, a diversity of systems of interaction, the multiplicity of possibly competing value systems and the fact that their products are located in different spatial and temporal scales. ServPPINs introduce the traditional research questions of service economics into network-based analyses of innovation. (Djellal and Gallouj, 2013 p. 30. highlighted by the authors).

According to Bučar et al. (2013), ServPPINs can be understood as a place for social interaction and the construction of social relations aimed at innovation. Nevertheless, of all case studies provided by the ServPPIN research project¹⁰⁵, several were not explicitly oriented towards the innovation target. For example, in some hospital case studies the main objective was to reduce costs in the use of technologies.

Similarly the CDM landfill projects we examined were implemented in order to reduce GHG emissions, rather than having the explicit goal of promoting service innovation. In fact, the technology and innovation outcomes appear to be additional results of the local co-benefits generation. Interesting changes and innovations are likely to arise out of such networks – which can then be retrospectively labelled 'innovation networks'. Taking into account non-technological,

¹⁰³ Innovation networks and systems have been the subject of an extensive literature in economics, sociology and management (Callon, 1992; Edquist, 1997; Latour, 1999; Lundvall, 1992; Nelson, 1993 among others).

¹⁰⁴ The technology issue is taken into account in the designs of the carbon market projects and regarding the promotion of social and environmental local co-benefits, in the cases studied, all Project Design Documents (PDD) and Validation Reports indicate the development and diffusion of technologies through the project's implementation, highlighting the following aspects: training, technology development and transfer.

¹⁰⁵ ServPPIN is an EU-funded research project which focuses on the role of public and private services on growth and welfare and the particular role of public-private innovation networks. For more information: <http://www.servppin.com/>. The main results of the project are also published in Gallouj, Rubalcaba and Windrum (2013).

incremental and non-programmed innovations (ad hoc, *bricolage*, rapid application etc.) it is also possible to consider even those networks which are not explicitly (or immediately) oriented towards innovation to be ServPPINs.

The ServPPIN contributes to opening up the traditional innovation network concept to new actors: all market services, as well as third-sector organisations (NGOs, associations etc.). It extends potential forms of participation for certain actors, for example, the involvement of civil society in the decision-making and consultation processes. This is particularly the case with regards to the role civil society plays in the ServPPIN context – helping to translate social preferences which are not merely reflected by market prices (Fuglsang, 2013).

Public Service Users and Their Involvement in Service Innovation

The innovation process involves several players who contribute in different ways in the development of service innovations. In this sense, the involvement of customers/service users as ‘partners’ in the process of service innovation development is highlighted, which can be achieved through dialogue with service users, joint experimentation, panels and other communication tools (Hertog et al; 2010). It is noteworthy in recent years that the participatory governance mechanisms have been widely promoted in developing countries (Speer, 2012). These mechanisms seek to involve citizens in decision-making regarding the allocation of public resources among communities, shaping public policy, as well as involvement in the monitoring and evaluation of government expenditure.

According to Speer (2012), one of the key reasons cited for participatory governance mechanism implementation is related to the improvement of public services. Given that when citizens are empowered and democracy strengthened there is a tendency to an increase in local government responsiveness and accountability. This process tends to improve the efficiency and sustainability of public service delivery, since it might have the ability to match public services to user preference.

Participatory governance mechanisms can improve information flows in two ways: from citizens to governments about citizen preferences/demands; and from governments to citizens about government decisions and actions, as well as about service provision outcomes.

Lehtonen and Tuominen (2013) emphasize the collective preferences of citizenship, with a broader vision of the citizen, not only as a public service receptor, but also active in the production, control and planning of these activities. The authors note that active dialogue is required to negotiate and mediate under different citizen preferences. In this context, the relevance of user integration in the service innovation process it is brought to attention.

However, ServPPIN research Project results (Gallouj et al., 2013) show the limitation of the third sector organizations’ participation and that the involvement of service end users (citizens) is marginal. Thus, especially regarding to the role that civil society has to play in ServPPIN – assisting in the translation of social preferences – there is a need to empower public users in order to foster successful cooperation.

Schilling (2011) points out that improvements in cooperation among the agents is coupled with the need to manage knowledge from different sources for successful service innovation, and also requires the capacity to sustain a constant flow of communication between the many agents (Green et al., 2013), which can be achieved through the establishment of routines and communication channels¹⁰⁶. The important role of information technology in the communication and processing of information in the service innovation process is also emphasized (Di Meglio, 2013).

Thus, to analyze the participation as well as the role of civil society in public-private service innovation networks it is important to sustain an adequate standard of public services, taking into account the quality of service and social needs, particularly with regards to municipal solid waste services from the case of landfills with CDM projects.

In order to explore participation in the empirical context studied, as well as proposed by Labarthe et al (2013), the end-users are not individual users that are integrated within the networks. It is rather some collective organizations representing them (here representatives of associations from the communities surrounding landfills), which are members of the ServPPINs, as presented in the empirical results section.

3 Empirical results: the Brazilian landfill CDM projects

Of the 325 Brazilian CDM projects registered, 50 are developed on landfills, 23 of which are located in the State of São Paulo (UnepRisoe, August 2014). Our research focuses on the São Paulo Metropolitan Area, which is one of the five largest urban conurbations in the world, and the largest in Brazil, with the city of São Paulo as the main nucleus. It comprises 39 municipalities with, approximately, 20 million inhabitants, 55.4% in the city (municipality) of São Paulo.

The landfills for the empirical research were selected on the basis of the following criteria: a) carbon market Brazilian projects: regulated and voluntary carbon market; b) projects scope: landfill projects; c) Localization: São Paulo Metropolitan Area; d) Methodology used to measure GHG emission reduction: ACM0001 – flaring or use of landfill gas; e) Monitoring period verified: with at least one monitoring period verified until the beginning of the empirical research (February, 2014). Through the prior criteria mentioned, the landfills selected are: Bandeirantes, São João, Caieiras, Itapevi, Pedreira, and Lara.

¹⁰⁶ In the majority of ServPPINs cases analyzed by Djellal and Gallouj (2013) it is clear that organizational innovations are related to better sharing of information, establishment of communication channels, etc. Examples: Capacity Planning (UK) – in the health sector; ITS Vienna Region (AT1), DoRIS (AT3), VIATIC (FR1), and Compano (AT2) – in the transport sector.

The data on the CDM landfill projects, from 2003 to 2014, were obtained through documentary research in three databases: United Nations Environment Program (UNEPRisoe), and UNFCCC CDM Registry, for accessing monitoring reports and project design documents; and The Ministry of Science, Technology and Innovation (Ministério da Ciência e Tecnologia e Inovação- MCTI) database for accessing the project documentation, based on Annex III of Resolution No. 01/ 2003 of the Inter-ministerial Commission on Climate Change (CIMGC) (document that describes the promotion of social and environmental co-benefits).

Particularly for the analysis of the participation of associations, representatives of associations from the communities surrounding landfills, and recycling cooperatives, data were collected through semi-structured interviews organised into three categories to discuss opportunities for service innovations: consultation, benefits, and interface/interaction (Table 1).

Table 1. Categories and items addressed to discuss opportunities for service innovations.

Category	Items Addressed
Consultation	Participation before and after project implementation; public consultation (public audiences, surveys, questionnaires, workshops, visitation, panels); PDD comments; language and clarity of documents; language used; community engagement
Benefits	Cooperatives benefiting from CDM revenues; contributions of CDM projects to environmental education programs
Interaction/Interface	Proposed meetings; disclosure of the annex III activities to stakeholders; channels for recording complaints; the coordination role achieved by the public sector

Source: The authors

The interviews were conducted, in the first semester of 2014, with 4 associations and 3 waste-picker cooperatives engaged in the solid waste issue.

3.1 Stakeholders Participation under the Carbon Market Projects

With regards to participation, specifically for carbon market projects, the CDM Executive Board requires stakeholders' participation in the whole process of the activity development, fulfilling: 1) Project proponents should send letters of invitation to all project stakeholders; 2) Summary of information should be presented by the stakeholders; 3) Confirmation by the host country that the project assists in the achievement of sustainable development; 4) Report made of DNA justifying how the comments provided were taken into account.

The project information must be available in an appropriate manner, ensuring data accessibility, in a language and framework that can be understood by all stakeholders.

Even though stakeholder participation is explicitly considered by the CDM Executive Board, the process is still considered insufficient, in terms of contemplation of the actors, and in terms of measuring participation throughout the project cycle.

The participation of stakeholders in CDM projects has been widely challenged at the international level also (CAN, 2011; CDM WATCH, 2010; Foronda et al., 2010; Subbarao; Lloyd, 2011; Kolmuss, 2012) indicating that there is still a gulf to be breached, due to the intense asymmetrical information among stakeholders and the lack of a clear understanding about how the resources from the sale of Certified Emission Reductions (CERs) should be applied, added to the unpreparedness of public bodies to clarify questions regarding the carbon market. Table 2 shows some elements related to public consultation, openness and transparency of information to support improvements in the participation of stakeholders.

Table 2. Elements for stakeholder participation in carbon market projects.

Topic	Public Consultation	Openness and transparency of information
Elements	Quality and range of communication tools between the project proponent and stakeholders (public audiences, surveys, questionnaires, workshops, visitors, panels, among other); Quality and range of publicity needed to achieve stakeholders; Frequency and timing; Period for Consultation; Place and time selected	Anticipation in the disclosure; means of divulgation; accessibility of language and language used

Source: based on Monzoni (2004) and CDM Watch¹⁰⁷ (2010).

¹⁰⁷ The CDM Watch is an organization created in 2009 with the purpose of supervising the actions performed under the CDM, particularly aimed at strengthening civil society participation processes.

In 2011, through public consultation, the United Nations Framework Convention on Climate Change (UNFCCC) conducted a study aiming to contribute towards the inclusion of different actors in CDM projects. The key findings of the public consultation were:

- The comments of the stakeholders should be considered during the design of the project;
- The first meeting with the stakeholders should be taken prior to the submission of the PDD;
- Validation and verification of the project to ensure the required benefits; and
- The establishments of mechanisms for affected stakeholders to express their demands.

The elements outlined may contribute towards the fulfillment of the requirements related to the complete and effective involvement of communities surrounding landfills (and other stakeholders) on the project, through access to information and participation in the decision making process.

According to Decision 3/CMP.1 (Marrakech accords), UNFCCC defines stakeholders as: “the public, or any individuals, groups or communities affected or likely to be affected, by the proposed CDM project activities”. Therefore the Designated Operational Entity (EOD), independent audit, responsible for the validation and verification of projects, should revise the PDD and other relevant documents for the validation and verification of the project, in order to evaluate, beyond the technical issues, if the requirements outlined by the CDM executive board in relation to stakeholders’ participation¹⁰⁸ are being met.

3.2 Characterization of the landfills and identification of stakeholder

The characterization of the landfills selected for the empirical research is shown Table 3.

Table 3: Characterization of the landfills related to operation and CDM Project.

Landfill	Location (São Paulo Metropolitan Area)		Year of beginning landfill operation / closure	Landfill area (ha)	Public / Private landfill	Tons of waste / day	Project registration date on CDM Registry	Crediting period	Average tCO ₂ e / year*
Bandeirantes	São Paulo	District of Perus/ Zona Oeste	1979/ 2007	140	Public	5,000	20 Feb 06	1st: Sep 06 - Sep 13 2nd: Dec 10 - Dec 17	1,000,000
São João	São Paulo	District of São Mateus/ Zona Leste	1992/ 2009	84	Public	6,000	02 Jul 06	May 07 - May 14	800,000
Pedreira	São Paulo	District of Tremembé/ Zona Norte	2001	56,2	Private	1,200	12 Feb 08	Feb 08- Feb 15	185,000
Caieiras	Caieiras		2002	350	Private	7,000	09 Mar 06	Mar 06 - Mar 13	770,000
Itapevi	Itapevi		2003	20,5	Private	900	17 Aug 07	Aug 07 - Aug 14	90,000
Lara	Mauá		1987	30	Private	1,500	15 May 06	1st: Sep 06 - Sep 13 2nd: Dec 10 - Dec 1	750,000

Source: The authors

* These data are based on the preliminary modelled/projected emission reductions from the PDD

The PDD section named “Stakeholders consultation¹⁰⁹” was investigated for each landfill selected as an empirical case, in order to map the stakeholders. A weakness was verified in the PDD, particularly in relation to the actors considered as “potentially affected populations”, i.e., communities surrounding landfills.

In the PDD “Stakeholders consultation” section, the stakeholders representative of civil society largely cited was the Brazilian Forum of NGOs and Social Movements for the Environment and Development; in other words, although the Forum is widely recognized for actions and activities aimed at protecting the environment and promoting sustainable development, it is generally for the purpose of this research to consider it as a stakeholder.

Thus, specific information about representatives of associations from the communities surrounding landfills directly affected by the activities of the enterprises was researched beyond the project design documents and the UNFCCC website, as well as direct searches on *Google* being used (web search engine tool) with the keywords: landfills name; cooperatives; associations/communities surrounding landfills.

In addition, the following databases were checked:

¹⁰⁸ The requirements are: Project proponents should send letters of invitation to all project stakeholders; Summary of information presented by the stakeholders; Confirmation by the host country that the project assists in the achievement of sustainable development; Report of DNA justifying how the comments provided were taken into account.

¹⁰⁹ This section includes: A brief description of how comments by local stakeholders have been invited and compiled; a summary of the comments received; and a report on how due account was taken of any comments received.

- ✓ Recyclable material Cooperatives listing, available in the website Department of Environment of São Paulo State – SMA¹¹⁰;
- ✓ “Registration of civil society organizations – database of 2009-2011” listing, available in the integrated Water Resources Management System (SIGERH)¹¹¹, taking into account mainly the data related to the watershed committee of *Alto Tietê*, regarding the geographical area selected for study;
- ✓ Websites of the municipalities at Itapevi, Mauá, and Caieiras;
- ✓ Websites of the subdistricts São Mateus, Perus, and Tremembé (city of São Paulo);
- ✓ Minutes of public audiences related to carbon credits;
- ✓ FEMA (Environment and Sustainable Development Fund) and Confema (Special Fund for the Environment and Sustainable Development Council) resolutions related to CDM projects (in this case, only for Bandeirantes and São João CDM projects).

Figure 1 shows, specifically, the stakeholders’ mapping of the representatives of associations from the communities surrounding landfills.

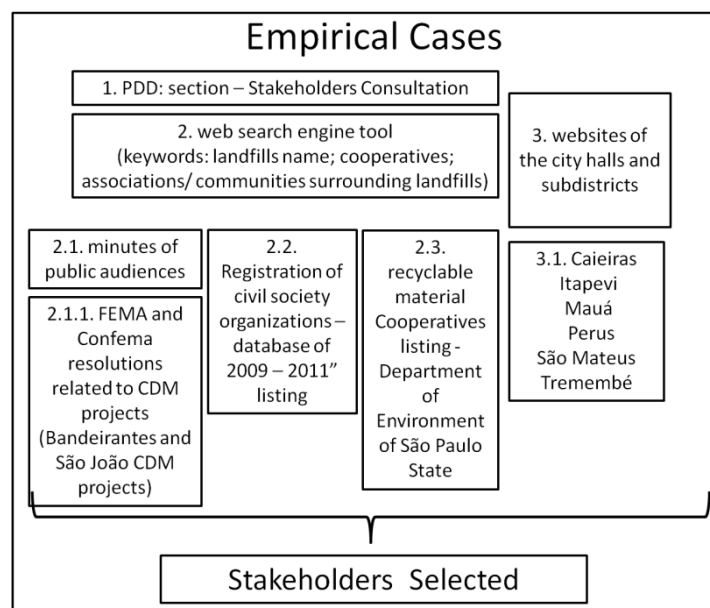


Figure 1. Stakeholders’ Mapping – associations from the communities surrounding landfills
Source: The authors.

From this mapping (addressed previously in Figure 1), Table 4 shows the representatives of associations selected.

Table 4. Representatives of associations selected.

Landfill	Representatives of Associations	Description
Bandeirantes	Perus and Anhanguera Forum for local sustainable development	Founded in 2003 with the purpose of organizing the popular participation and demand improvements for the region of <i>Perus</i> .
São João	Chico Mendes Cooperative	Founded in 1999 with the purpose employment generation for people on low income in the East Zone of São Paulo
	More Life, Less Rubbish Campaign (<i>Campanha Mais Vida Menos Lixo</i>)	Initiative of the residents of <i>São Matheus</i> district that have mobilized against the bad odours and the possibility of accidents occurring due to the activities performed by the landfill

¹¹⁰ <www.ambiente.sp.gov.br>

¹¹¹ <www.sigrh.sp.gov.br>

Landfill	Representatives of Associations	Description
Caieiras	Pinheiros Philanthropic Association	Founded in 1993 with the purpose to assist the local residents of <i>Caieiras</i> region (around 450 families)
Pedreira	Cantareira Viva Cooperative	Founded in 2006 with the purpose to enable the selective waste collection, income generation, and stimulate improvements in <i>Vila Albertina</i> the region (a neighborhood in the <i>Jaçanã/Tremembé</i> district, São Paulo)
Itapevi	Itapevi Cooperative	Founded in 2003 supported by the Municipal Department of Environment. Currently with 20 registered cooperative members
Lara	Association of Literacy Movement for Youth and Adults (AMOVA)	Founded in 2002 in the city of <i>Mauá</i> ; is focused on providing housing to low income people, through partnerships with <i>Caixa Econômica Federal</i> (Brazilian bank) and the Ministry of Cities

Source: The authors.

For the public sector, stakeholders include the city halls and municipal sub districts, as well as the departments related to CDM projects issues. For the private sector, the stakeholders include the concession-holders responsible for landfill management in the case of public landfills, the company that owns the landfills in the case of private landfills; and the concession-holders responsible for biogas recovery and power generation.

3.3 Participation Gaps

The role and participation that civil society has to play in the ServPPIN – helping to translate social preferences – are fundamental to promote service innovation. Besides that, within the CDM projects context, participation is considered a core issue for the project to comply with the goal of promoting local sustainable development.

According to data collected from the representatives of civil society, the communities surrounding landfills lack information regarding the existence and operation of the CDM landfill projects; in addition there is no knowledge about local benefits promotion that the projects must perform. The major gaps identified are addressed in the following topic.

a) Consultation

The period designated for stakeholders to manifest their opinion about the project (30 days, set by UNFCCC) is considered inappropriate by the interviewees' representatives of *Bandeirantes*, *São João*, and *Itapevi* landfills. The interviewees of the other landfills were unaware about the availability of documents related to the CDM projects to be accessed and commented on.

Other issues raised are related to: difficulties in obtaining documents in the UNFCCC and MCT&I online platforms; the lack of documents available in the native language; and the technical language used in the documents related to the projects. Without a common language, surrounding communities may remain unaware of any possible benefits arising out of project implementation. Furthermore, the establishment of a common language can improve exposure of the different interests at stake. The asymmetric information problem diminishes, or even hampers, an effective participation of the associations of residents surrounding landfills.

With the exception of the *Bandeirantes* and *São João* landfills, which both held public audiences and meetings, there is no information on the existence of meetings, workshops and other types of mechanisms to facilitate the participation at the other landfill sites. However, even in the *Bandeirantes* and *São João* landfills cases, it is emphasized that the respective communities suffer difficulties to voice their claims in an effective manner: the views of the municipality and the operating company's technicians usually prevail.

It is thus necessary to develop the competence of the associations (from the communities surrounding the landfills) to discuss technical indicators about landfill operation and closure plans, as well as other alternatives for final waste disposal. There is a need on the part of technicians at the municipal departments, concession-holders, and CDM project developers to ensure that data communicated about CDM projects can be easily understood by the communities surrounding the landfills.

With regards to the PDD section named "Stakeholder consultation", only the *Bandeirantes* landfill did not receive comments from stakeholders. For other landfills, the comments were generally performed by Municipal Departments of Environment, Public prosecution, and state and municipal environmental bodies.

Only the *Itapevi* landfill received comments from the Brazilian Forum of NGOs, pointing out the need for improvements in local stakeholder involvement and the importance of setting up transparency mechanisms related to the projects; and *Itapevi* Public Prosecution declaring that the PDD of the landfill was not submitted in a local consultation process. Therefore, it is observed that the comments received mostly do not regard the stakeholders as set

out by the Kyoto Protocol: individuals, groups or communities affected or likely to be affected, by the proposed CDM project activities.

b) Benefits

According to the preferences of representatives of civil society, the projects should contribute to reduce or to avoid negative externalities generated by landfills. That is, to reduce pollution; to reduce risks (related to the activities performed by landfills); to increase quality of life; to ensure cooperatives and environmental education programs benefit from the resources of CDM.

In the PDDs, only Caieiras and Lara landfills mentioned the proposition of future projects to be carried out from the CER resources. Despite this, the absence of means for monitoring/supervising, if these proposals are to be implemented, is brought to attention.

The cooperative of Itapevi, was awarded with equipment for compacting waste; and the Caieiras landfill transfers 1% of the CER resources (Candiani et al 2013) to the Municipal Social Fund to be invested in the areas of education, health and environment. For the other landfills, there is no information about cooperatives and associations that benefited with the resources of the projects. Specifically for Bandeirantes and São João landfills, problems of access to revenue from the sale of Certified Emission Reductions are noteworthy. The access to CER resources intended for FEMA¹¹² occurs through public tenders. However, sub-districts need to develop their competence in order to be able to publicize good quality projects and thus access revenue from the sale of carbon credits.

ServPPINs require increased flexibility from the public sector. Therefore, particularly in relation to the means for accessing the resources from CER (public tenders), it is recommendable to review the public tenders, adapting the requirements to the real situation of the cooperatives; to propose ways to support the cooperatives (i.e. action plans to capacitate the cooperatives to be able to design good quality projects and thus access the revenues from the sale of carbon credits); to prevent that bureaucratic issues hinder access to CER resources.

c) Interaction/Interface

While evaluating the existence of communication channels for receiving complaints, inquiries and comments from stakeholders, it is pointed out that there are no effective channels for participation of civil society associations and cooperatives surrounding landfills throughout the stages of the project cycle. Some of the complaints mentioned by the interviewees affected by the São João, Bandeirantes, Itapevi, and Caieiras landfills are related mainly to: the odor from the landfills; the misdirection of the resources derived from the sale of CERs; and the lack of benefits generated from the projects for the community. Moreover, it is observed that there is a need to publicize activities related to CDM projects and implement an effective communication channel that would improve discussions, negotiations and disclosure to the various stakeholders via public consultations and dialogue mechanisms.

Largely, the interactions are restricted to public audiences and meetings concerning the application of the resources from the sale of the carbon credits generated by Bandeirantes and São João CDM projects. At the other landfills, the interface is considered only by the availability of documents in the UNFCCC and MCT&I online platforms to receive stakeholders' comments about the projects. As highlighted by the ServPPIN concept, it is essential to empower the public sector and civil society for cooperation. In addition, it is important for the public sector to perform network coordination in an appropriate manner.

4 Conclusion

The ServPPIN concept highlights the importance of interaction/interface among public and private organizations and mainly, third sector organizations, for developing innovative services.

In this way, through the application of the ServPPIN concept, it was possible to identify and analyze the factors related to the establishment of fundamental conditions for public service innovation in the municipal solid waste sector through the implementation of landfill CDM projects.

For the analysis, the following variables were considered: consultation; benefits; interaction/interface.

- ✓ **Regarding consultation**, the main gaps identified are related to the period for stakeholders to voice their opinion about the project – 30 days, as set out by UNFCCC, is considered inappropriate. Other issues raised are related to: difficulties in obtaining documents in the UNFCCC and MCT&I online platforms; the lack of documents available in the native language; and the technical language used in the documents related to the projects (generating asymmetric information). The comments pointed out in PDD section “Stakeholder consultation” in general, do not regard the stakeholders as set out by the Kyoto Protocol (individuals, groups or communities affected or likely to be affected, by the proposed CDM project activities).

¹¹² 50% of the revenues from the Certified Emissions Reductions (CER) of the Bandeirantes and São João landfills are allocated to municipal government, specifically to the Environment and Sustainable Development Fund – FEMA, which is administered by the Municipal Department for the Environment.

- ✓ **Regarding** the benefits provided by project implementation, the absence of means for monitoring/supervising is highlighted, if the proposals described in the documents related to the projects are to be implemented. Additionally, and specifically for Bandeirantes and São João landfills, problems are noteworthy of access to revenue from the sale of Certified Emission Reductions, which occurs through public tenders, and the need to develop competences is highlighted, in order to make the cooperatives able to design good quality projects and, thus, access the revenue from the sale of carbon credits.
- ✓ **Regarding** the interaction/interface, the absence of effective channels for receiving complaints, inquiries and comments from stakeholders and the need to publicize activities related to CDM projects throughout the whole crediting period are noteworthy. For the Bandeirantes and São João landfills, interactions are restricted to public audiences and meetings concerning the application of resources from the sale of carbon credits. For the other landfills, interface is only considered from the availability of the documents in the UNFCCC and MCT&I online platforms.

Overall, the results presented corroborate with the results shown in the international literature regarding stakeholder participation under the carbon market projects (CAN, 2011; CDM WATCH, 2010; Foronda et al., 2010; Subbarao; Lloyd, 2011; Kolmuss, 2012), and in the ServPPIN research Project results (Gallouj et al., 2013) pointing out that service end user (citizen) involvement is marginal.

ServPPINs enable potential complementarities and synergies to be explored in various modes of cooperation between public, private and civil society organizations. In this way, in the instances studied, it is essential to empower the public and private sectors and civil society. Besides this, it is important the public sector performs the coordination of the network in an appropriate way. The proactive role of the public sector as a network leader turns out to be a very important determinant of success in the CDM landfills cases, as instruments capable of contributing to public service innovation in the municipal solid waste sector.

Pulling this theoretical (ServPPIN) and empirical research (landfill CDM project) together, once can identify the main factors constraining and affecting the establishment of the basic conditions for service innovation. Based on the set of case-studies investigated, lessons have been drawn concerning:

- a) The interactions and the building of social relations aimed at innovation among various stakeholders involved
- b) The development of competence on several fronts, especially, relational and organizational
- c) The role of the public sector (mainly, the coordination role) in supporting the development of successful public-private innovation networks in services

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Evidence on the role of user orientation for innovation and productivity in Finnish service firms

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Acknowledging user needs as important for the success of the firm has been common practice both at innovation policy level and in academic literature. But empirical evidence on the role of user orientation for firm performance is still scant. This paper contributes to the empirical user innovation literature by analysing the role of user orientation for innovation and productivity at the firm level. Our unique dataset from Finland allows us to analyse how the intensity of user orientation affects the above complex innovation-productivity relationships following a CDM model. Our first results show differences between service firms and manufacturing firms. Only for service firms user orientation has a significant positive association with innovation output. But not any kind of user orientation is significant in services. Only combinations of user orientations and the intensity of user orientation matter: active user innovation is more relevant than passive user consideration. Despite significant impacts from services innovation on productivity, there are no direct significant impacts from user involvement.

Key words: services, innovation, productivity, user orientation, user innovation, interaction with customers, open innovation, CIS

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1 Introduction

Most existing literature conclude on a positive relationship between investments in knowledge, product innovation output and labour productivity, both in development and in developing economies (e.g., Mairesee and Robin, 2010, Crespi and Zúñiga, 2012), not only for manufacturing but for services too (Cainelli et al., 2006, Loof, 2004, Criscuolo, 2009). However, evidence on the role of customers and users for firm performance is mixed and no clear picture exists on the issue (Laursen and Salter 2006, Belderbos et al. 2004, Harhoff et al. 2014). Given the stylized fact that understanding user needs are crucial for the success of the firm this is a surprising observation (SPRU 1972, 1974; Von Hippel 1976, 1978).

In the case of services, empirical evidence is particularly needed since case studies and service literature has shown the extremely important role of users in service co-production and service innovation (Gallouj, 2002; Sundbo and Toivonen, 2010), even if external sources for innovation, in which users are a major actor, play a major role for incremental innovation but not necessarily for radical innovation in Europe, where size or R&D investment can be more relevant (Battisti et al., 2014). Therefore the focus of this paper is on analyzing if and how user orientation contributes to innovation and productivity at the firm level.

To be able to reach the above objective the paper builds on the CDM model from the economics literature where it is used to empirically study the impact of innovation on productivity. CDM allows us to model the complexity of the innovation process. The outcome of our analysis will shed light on the relationship between user orientation and innovation and between user orientation and productivity. Because open innovation practices such as user orientation are important for functions of the firm beyond R&D, such as HRM, procurement and manufacturing and IT its relationship with innovation output and production output can differ (see Vanhaverbeke et al., 2014). Moreover, in services, innovation sources are far beyond a relatively less important use of R&D (Tether, 2005, Rubalcaba et al., 2010) and the relationship between innovation and productivity is far to be simple given the problems for measuring service productivity inputs and outputs (Gallouj and Savona, 2009, Djellal and Gallouj 2013).

To incorporate user orientation as a source of innovation in our model we build on the research on open innovation and user innovation from the innovation management literature (Laursen and Salter 2006). Open innovation is a relatively new field of research; although it has been influential in the field of innovation studies it has had limited impact upon broader disciplines of management and economics (West et al. 2014). Based on that literature hypotheses will be developed and different measures of user orientation will be constructed. It is for example useful to distinguish

between different degrees of user involvement as they are expected to have different impact on the performance of the firm.

We address the above research questions empirically based on a recent and unique set of Finnish firm level data. Using data on the CIS2010 linked to business register and financial data the analysis allows for analysing more reliable measures of labour productivity (i.e., based on real data not on CIS-like perceptions of productivity growth). In addition it allows for testing the impact of lag structures. Recent empirical evidence on the role of user orientation for firm performance is still very scant, supposedly due to the lack of available data. Our paper offers new empirical evidence and contributes to filling the empirical research gap on user orientation and firm performance. The motivation for the paper is to look for empirical evidence on the role of different means and intensities of user orientation in the performance of firms in services and manufacturing and to shed more light on the mechanisms at work.

The remainder of the paper is organized as follows: section two gives an overview of the previous literature on user orientation and firm performance. Section three describes the data and the empirical model Section 4 presents the results and the robustness checks and section 5 provides a discussion of the conclusions.

2 Literature review

This paper builds on two stretches of literature. From the economics literature on innovation, and productivity we borrow our empirical set-up that combines decisions on innovation inputs with outcomes in innovation and productivity, following the existing recent CDM works in for the area of services. From the innovation management literature on open innovation and user innovation we take into account the knowledge on how open innovation and user innovation has been described to affect firm performance. This included the impacts of users on innovations and the impacts on firm performance; both from the consideration of passive users in innovation and from the user co-innovation as well. Our approach will cover both aspects of user orientation for services while integrating both under the CDM framework.

2.1 Innovation and productivity

The empirical analysis of innovation and productivity has built continuously on the CDM model of Crépon, Duguet and Mairesse (1998) that takes into account innovation inputs, innovation outputs and production outputs and that corrects for selectivity and endogeneity (see Hall 2011 for an overview, Criscuolo 2009, Love et al. 2011, Crespi and Zuniga 2011, Hall et al. 2012). Variants of this structural model are to be preferred to single equations as it takes into account the innovation process and its complexity. However the focus in these models have often been on the unbiased estimation of the innovation input on the innovation output and of the innovation output on productivity while other variables of interest have been added in as controls. As our primary interest in this paper is on user orientation and firm performance we aim to integrate this focus in the context of a CDM model variant.

The relationship between innovation and productivity has already been explored for the case of services, even if at a limited extent compared to the large literature on the topic proving the positive relationship for manufacturing (e.g., Crepon et al., 1998, Crespi and Zúñiga, 2012). The two ways approach by Cainelli et al (2006) showed how innovation led to positive impact in productivity levels in the three years after. Mairesse and Robin (2009) compare manufacturing and services in France to find significant positive effects of product innovation on productivity and no effect or very little when process innovation is considered; impact from product innovation on services productivity are even higher than impacts on manufacturing productivity. However, Criscuolo (2009), based on the CDM model and using a CIS data for 14 mostly OECD countries shows that the productivity effect of product innovation is larger in manufacturing than in services in most of the countries. In developing economies positive impacts from innovation on productivity have also been reported following a CDM model, than in the case of Chile (Alvarez et al., 2012) and Uruguay (Aboal and Garda, 2012). The Uruguayan case has shown how in manufacturing technological innovation are more relevant for productivity while in for services non-technological innovation have a more important role.

Beyond the approached for the whole of set of services, a particular attention has often been paid to business services and knowledge-intensive business services. For the US business services firms, Mansury and Love (2008) find positive effect of service innovation on growth but not on productivity, what is coherent with the European results underlining the impacts on service innovation is quality and market differentiation but not so much on costs and productivity given the often increases of costs related to business service innovations (Rubalcaba et al., 2010) leading to major positive impacts on employment (Evangelista and Savona, 2003). For the Swedish case, Löf (2004) finds that knowledge intensive manufacturing and knowledge intensive services present similar regression positive results when analysing innovation and productivity, suggesting that R&D and innovation contribute very little to explain the large productivity differences between those major knowledge intensive branches.

2.2 The role of users on innovation and performance

A key finding of the influential SAPHO project from the seventies was that successful innovators have a better understanding of user needs than their unsuccessful counterparts (SPRU 1972, 1974; Rothwell et al. 1974). With

success these early authors referred to market share and profitability¹¹³ induced by single innovations. In addition to understanding user needs also the insights in user involvement matter (Radosevic and Yoruk 2011). Further key dimensions of successful innovators are attention to marketing, use of external knowledge sources and leadership. The overall conclusion of the above research is that successful innovations do combine technology with market needs. Von Hippel further analysed the SPRU data and underlined the importance of (lead) user/customer involvement in the innovation process (Von Hippel 1976, 1978, 1988; Urban and von Hippel 1988).

The technology sourcing literature and innovation management literature have revealed a tendency towards more distributed innovation processes both geographically and external partners wise (Chesbrough 2003, Laursen and Salter 2006, Chesbrough and Bogers 2014, West et al. 2014). Dahlander and Piezunka (2014) examine external suggestions by customers and find that external cooperation by customers is an unusual case with less than 10% of the firms receiving multiple suggestions per month. However there is little evidence available for corporate decision makers of how the different forms of opening the innovation process impact firm-level outcomes.

User innovation research and open innovation research both encourage firms to look beyond their borders for sources of innovation. Hence it does not come as a surprise that user innovation researches are increasingly at play in the arena of open innovation research. However, a clear difference in both traditions relates to their diagonal stance on appropriability. The user innovation researchers did criticize appropriability because it limits innovation and welfare and because the inventors are anyway better off if they reveal inventions for free. While open innovation is a firm centric theory of innovation, user innovation focuses on consumer, individual and societal welfare (West et al. 2014).

Belderbos et al. (2004) studied the relationship between cooperative R&D and firm performance for a sample of 2056 innovative Dutch firms in a two cross sectional approach for the years 1996 and 1998. They use two alternative measures of performance, the growth in net value added per employee (labour productivity growth) and the value of sales per employee of product and services that are new to the market (innovation sales productivity growth). Customers and universities are important sources of knowledge for firms pursuing radical innovations, which facilitate growth in innovative sales in the absence of formal R&D cooperation. Or in other words, customer cooperation is not significant but customer spill-overs are significant for growth in new to the market sales per employee.

Harhoff et al. (2014) find cooperation with customers and competitors not appear to help technology sourcing. However, they underline that their findings do not imply that cooperation with customers is not beneficial for the firms. After all they only measure effects on total factor productivity. It is indeed recommended to use multiple measures of firm performance as to test the robustness of the findings, especially in the light of policy implications. Cooperation with customers can be a boost to selling the products abroad, even if it does not increase the productivity at home. They underline that cooperation with customers are often entered in order to adapt existing products to new markets. Companies have the opportunity to learn about the demand and preferences of customers and adapt to local tastes (von Hippel, 1988).

2.3 Customers, users and performance in services

There is a wide range of empirical studies that used Europe's Community Innovation survey (CIS) to measure firm open innovation practices and the use of external sources and collaboration in the innovation process (Laursen and Salter 2006; Ebersberger et al. 2010; Love et al. 2011). Love et al., prove the role of customers in innovation output at the exploratory stage of the innovation process for UK service business (not so much on the transformation or developments stages). Previously, Laursen and Salter (2006) analysed how openness explains innovation performance among UK Manufacturing firms. They find that lead users are significant for radical and incremental innovation and use innovative sales shares of new to the world and new to the firm products as dependent variables, testing a U-inverted shape curve for external sources. A different result is obtained by Wimdrum *et al* (2013) and Battisti *et al* (2014) both for manufacturing and services companies at EU and sector-aggregated level, where external sources are proved to be important for incremental innovations but not for radical innovations; internal sources such as R&D and company size play a more relevant role.

For a sample of 800 UK firms Mina et al. (2014) examine how manufacturing and service firms differ in their use of 14 different approaches to open innovation collaboration. They find that informal collaborations are predicted by the importance of services and market-based knowledge, while formal collaborations are predicted by the importance firms place on formal appropriability. External sources play also a role for cooperation agreements in the EU case (Gallego et al., 2013).

The Innovation Value Chain (IVC) approach (Hansen and Birkinshaw 2007) encouraged Love et al. (2011) to empirically analyse the process through which business service firms source knowledge, innovate and then exploit or commercialise innovation to generate business growth. Using in essence a variant of the Crépon et al (1998) model the authors do not find any effect of customers on sales growth nor on innovative sales. More interestingly their result highlight that the importance of the link to customers often found based on Community Innovation Survey (CIS) data could be explained by the exploratory linkages to customers in the knowledge sourcing stage of the innovation process.

¹¹³ Successful innovations are those that managed to establish a worthwhile market or profit while unsuccessful innovations are those that failed to establish a worthwhile market or profit, despite being a technical success. Radosevic and Yoruk (2011) define successful innovations as reaching a sales growth of more than 10% (1 year) after the launch of the innovation.

Their results should be carefully read as they only apply to UK based business services and a limited number of self-reported contemporary sales growth figures.

Ashok et al. (2014) analyse the role of end-user collaboration for process innovation in services. For a sample of 166 I.T. firms they find that benefits from collaboration are not automatic, as the firm's commitment of internal sources fully mediates the impact of the intensity of end-user collaboration and breadth of external collaboration on process innovation. In line with the above results for process innovation, Foss et al. (2011) concluded that impact of customer collaboration on product innovation performance was mediated through organisational practices.

Based on the above findings from the economics literature on innovation and productivity and the innovation management literature and we will develop a set of hypotheses. At this early stage of our analysis we will explore four hypotheses.

Hypothesis 1: "User orientation has a positive relationship with innovation output".

Hypothesis 2: "Innovation has a significant impact on productivity but user orientation may have no significant impact on labour productivity".

Despite the aforementioned mix evidence on the users' role on innovation and output, we can work under the hypothesis of a positive impact on innovation output and a non-significant one on labour productivity. The first hypothesis is based on the fact most service innovation literature stresses the importance of users in service co-productions and innovations (Gallouj and Weinstein, 1997; Sundbo and Toivonen, 2011) and the problems of measuring productive and innovation in services have been explained by the statistical under-representation of non-observable service innovation and non-observable service performance (Djellal, and Gallouj, 2013), that may heavily affect the understanding of the role of users through statistics. The new Finnish data on user should allow us to mitigate part of the major gaps struggling previous CIS-based analysis on services. New data should make service innovation and performance more visible and inter-linkages more observable.

The second hypothesis stresses the expected relationship between innovation and productivity in services in the line of the CDM models reported before but focuses again on the interactions between services suppliers and users: these interactions are ones more likely to generate positive impacts on quality and employment (Rubalcaba et al., 2010, Evangelista and Savona, 2003) and not so much on productivity. Moreover, service innovation impact could have a little or non-significant impacts on productivity if just short-term effects and only technological innovation is considered. Long-term effects and the consideration of non-technological innovations, as done in Aboal and Garda (2012) should lead to more positive effects. This hypothesis is also coherent with the non-significant results from customers in innovative sales found by Crepon et al (1998) and the non-automatic results found by Ashok et al. (2014).

The Finnish data allow a distinction between different types of user orientation. In particular, we can distinguish between user consideration for innovation (customer feedback, market studies, etc.), users as resources of innovation activities (brainstorming, user communities, crowdsourcing, etc.) and user innovation (products developed by users at the early stage before development or at development stage). According to the literature on user driven innovation in services (Sundbo and Toivonen, 2011) we can expect a higher impact on both innovation and production outputs from users innovation than the mere users consideration for innovations. User innovation can be enlarged to some extent to the concept of users as resources of innovation activities since users are providing ideas in this way that can be essential for innovation.

Hypothesis 3: "User innovation plays a more crucial role than user consideration for innovation and production output".

Finally, the existence of 6 Finnish-CIS categories of users involvement in innovation allows us to the breadth and depth categories that Larsen and Salter (2006) used for the analysis of external sources in innovation. In this case, we analyse different alternative or complementary ways of user involvement. However, we cannot make of hypotheses of a U-inverted form in the use of users ways of involvement as Larsen and Salter did for the use of external sources. There is no reason to expect a decrease in the marginality of additional more intensive engagement of users on innovation since different types of user engagement relate to different phases not necessarily cumulative (Kuusisto et al., 2013). Hypothesis 4 establish that user depth can be more important than breadth since the intensive if the user engagement deems to be more relevant than the variety of ways of engagements according to the previous literature on services (Gallouj, 2002, Sundbo and Toivonen, 2011) and to the role of external sources depth in services business performance (Battisti et al 2014).

Hypothesis 4: "User depth is more important than user breadth both for innovation and production output".

3 Data and empirical set-up

The analysis in this paper is based on the Finnish CIS data from 2010 that contains more extensive (related to previous data sets used in the literature) and hence unique data on the innovation knowledge channels between users and firms. These data have undergone a preliminary descriptive exploration (Niemi and Kuusisto 2013; Kuusisto et al. 2014). The descriptive analysis concluded that the work of users to modify or develop products has often been important for product innovators in sample. Roughly one third (one seventh) of the firms reported that users contribution was important in adapting (developing) innovative products the firm commercialised. Based on correlations it was further found that firms reporting product innovations with significant user involvement are also more often involved in

launching new to the market products. Finally they refer to fine-tuned CIS2012 surveys currently being processes at Portugal and Switzerland including user orientation questions following the Finnish example.

3.1 Data and descriptives

This paper explores a unique firm-level dataset from Finland containing extensive information on user orientation practices of firms both from manufacturing and services. When the 2010 Community Innovation Survey (CIS2010) was send out to a representative sample of EU firms only the Finnish firms were asked about the importance of user orientation practices. The first descriptive results on these user orientation practices were recently published (Niemi and Kuusisto 2013, Kuusisto et al. 2014). However, no analysis has been undertaken based on a richer dataset that merges the unique survey data with hard firm level data. To address the relation between user orientation, innovation and productivity at the firm level we did construct such a database that linked the Finnish CIS2010 survey to Business Register data and Financial Statement statistics from Statistics Finland. The CIS2010 is a cross section referring to the period 2008 to 2010 while the merged administrative data contain the most recent available information on firm performance for the period 2008 to 2012.

Table 1. Descriptive statistics of services and manufacturing sample.

SAMPLE	Services 1031 obs.		Manufacturing 1027 obs.		Full sample 2058 obs.	
VARIABLE	Mean	S.D.	Mean	S.D.	Mean	S.D.
Innovating firms	0.21	0.41	0.27	0.45	0.24	0.43
Firms that performed R&D	0.37	0.48	0.51	0.50	0.44	0.50
Firms with product innovation	0.35	0.48	0.42	0.49	0.39	0.49
New to the market	0.20	0.40	0.26	0.44	0.23	0.42
New to the firm	0.26	0.44	0.33	0.47	0.29	0.46
Firms with process innovation	0.31	0.46	0.41	0.49	0.36	0.48
Firms with organizational innovation	0.37	0.48	0.39	0.49	0.38	0.49
Firms with marketing innovation	0.32	0.47	0.32	0.47	0.32	0.47
Expenditure on innovation* (in 1000 EURO)	1 443	6 313	10 166	111 363	6 316	83 412
Innovation intensity* (% turnover)	0.08	0.21	0.07	0.20	0.07	0.21
Innovation expenditures by employee* (in 1000 EURO)	12	35	15	42	14	39
Turnover from product innovations for innovators	0.067	0.164	0.072	0.153	0.070	0.159
Capital intensity (capital by employee, in 1000 EURO)	87	343	267	1 616	177	1 169
Labor productivity (turnover by employee)(in 1000 EURO)	355	1 803	291	598	323	1 344
Labor productivity (value added by employee) (in 1000 EURO)	67	61	69	135	67	105
Number of employees	134	664	186	678	160	672
SME	0.89	0.31	0.84	0.37	0.87	0.34
Turnover (in 1000 EURO)	49 702	295 100	92 565	765 200	71 092	579 800
Age	21.4	20.0	22.7	19.4	22.0	19.7
Firms within a group	0.50	0.50	0.50	0.50	0.50	0.50
Firms receiving public support	0.14	0.34	0.30	0.46	0.22	0.41
International markets	0.27	0.44	0.65	0.48	0.46	0.50
Cooperated	0.18	0.39	0.32	0.47	0.25	0.44
Cooperation (index)	0.03	0.09	0.08	0.14	0.06	0.12
Inward cooperation (index)	0.04	0.10	0.09	0.16	0.06	0.14
Outward cooperation (index)	0.03	0.07	0.06	0.12	0.04	0.10
Co-operated with foreign partners (Int. coop as share of total c	0.02	0.07	0.05	0.11	0.04	0.10
National cooperation (index)	0.13	0.29	0.22	0.35	0.17	0.32
Cost-based obstacles for innovation	0.29	0.31	0.39	0.31	0.34	0.31
Knowledge obstacles for innovation	0.27	0.26	0.35	0.25	0.31	0.26
Market obstacles for innovation	0.29	0.27	0.36	0.26	0.33	0.27
Total obstacles for innovation	0.28	0.25	0.37	0.24	0.33	0.25
Cooperation with suppliers (cocsupd)	0.158	0.37	0.30	0.46	0.23	0.42
Cooperation with customers (cocusd)	0.175	0.38	0.30	0.46	0.24	0.43
Cooperation with other firm (coofd)	0.159	0.37	0.29	0.46	0.23	0.42
Cooperation with public organizations (copod)	0.151	0.36	0.29	0.45	0.22	0.41

Data source: Statistics Finland. *For these variables tabulated descriptive statistics refer to 793 firms with strictly positive innovation expenditures (350 from services and 443 from manufacturing).

After cleaning out firms with insignificant turnover and tiny employment from the merged dataset the representative sample of service and manufacturing firms contains 2058 firms of which 24% were categorised as innovative firms (firms with strictly positive innovation expenditures and sales of innovative products and services). As a background to our econometrical analysis Table 1 describes the key input and output characteristics and additional control characteristics of the firms in sample. Almost half of the firms (44%) reported to perform in-house R&D and also for service firms in sample this innovation input related figure was rather high (37%). The average expenditure on innovation inputs crossed the 6 million EURO gap or 7% of total sales. The average manufacturing firm has 7 times higher innovation expenditures than the average firm from the service sector. The innovative activities these firms

undertook could either have been related to product innovations (39%), process innovations (36%), organisational innovations (38%) or marketing innovations (32%). Innovative sales from new products for the average firm accounted for 18% percent of the total sales. Production output of the average firm was 323 thousand EURO in terms of turnover per employee and a much lower 67 thousand EURO in terms of value added per employee. Our analysis will correct for intermediate inputs and will analyse both production output measures.

Table 2. Importance of user orientation dimensions for innovation activities by industry.

SAMPLE	Services		Manufacturing		Full sample	
	1031 obs.		1027 obs.		2058 obs.	
VARIABLE	Mean	S.D.	Mean	S.D.	Mean	S.D.
CATEGORIES OF USER ORIENTATION (dummies)						
USER CONSIDERATION						
Feedback (dummy)	0.36	0.48	0.38	0.48	0.37	0.48
Market studies (dummy)	0.21	0.41	0.22	0.42	0.22	0.41
Survey needs (dummy)	0.16	0.36	0.16	0.37	0.16	0.37
USER INNOVATION						
Ideas (dummy)	0.14	0.34	0.11	0.31	0.12	0.33
Product adaptation (dummy)	0.16	0.37	0.21	0.41	0.19	0.39
New products (dummy)	0.07	0.25	0.10	0.30	0.08	0.28
SUMMARY MEASURES OF USER ORIENTATION						
Total user orientation index	0.117	0.148	0.127	0.151	0.122	0.150
User consideration index	0.225	0.281	0.236	0.284	0.231	0.282
User innovation index	0.126	0.215	0.144	0.225	0.135	0.221

Note: The first part in the above table contains the shares of firms that reported a certain user orientation dimension to be of medium to high importance to them. Data source: Statistics Finland.

Table 2 includes the importance of ways and modes of including customers and users in innovation activities and production of innovative products. The first block in Table 2 shows the self-reported importance of different dimensions of user orientation. Focusing on individual user orientation measures may miss to capture the general user orientation strategy of the firm and therefore the second block contains general measures of user orientation. Overall two key findings emerge: (1) the more intense the interaction with users, the less frequent it is of importance. (2) In services user orientation is slightly less frequent of importance than in manufacturing, except in the case of user ideas (users as a resource of innovation activities), what support the idea of having ideas as part of the user innovations in services; user engagement is different to users engagement in manufacturing. Definitions of all user orientation and other regression analysis variables are presented in Table A1 while Table A2 and A3 present the descriptive statistics for the innovator sample only.

However, looking at more detailed sectors shows that the importance of user consideration especially lights up in the service sectors such as ICT, the financial sector, the scientific activities industry and the wellbeing sector and to a lesser extent in manufacturing industry (results not tabulated). The importance of user innovation is roughly in line with that of user consideration but it shows up to be less important in the wellbeing and financial sector. The more technology is involved in the manufacturing firms or the higher the knowledge base of the service firms, the more often the firms report user orientation to be for their innovation activities. In addition we found users to be twice as important for the biggest firms than for the small firms. As such firm size can be expected to play an important role in explaining the importance of user orientation. When plotting the importance of user orientation dimensions by firm age no big differences emerge between firm age categories although overall a higher share of young firms indicate user orientation to be of importance for their innovation activities.

Following Laursen and Salter (2006) Table 3 tabulates the external search breadth and search depth for our firms in sample. In a comparable way we also calculated what we call the *user orientation breadth* and *user orientation depth* and further added the R&D collaboration breadth and R&D collaboration depth figures. The tabulated measures are informative as they summarize the average firm strategy on openness and user orientation for innovation and their role for innovation and production output will therefore be tested in our regression analysis.

Table 3. Openness and user innovation strategy measures of the firms in sample.

SAMPLE	Services 1031 obs.		Manufacturing 1027 obs.		Full sample 2058 obs.	
VARIABLE	Mean	S.D.	Mean	S.D.	Mean	S.D.
External search breadth	0.350	0.414	0.471	0.435	0.411	0.429
External search depth	0.067	0.102	0.094	0.128	0.080	0.117
User orientation breadth	0.287	0.352	0.313	0.350	0.300	0.351
User orientation depth	0.059	0.130	0.061	0.142	0.060	0.136
Collaboration breadth	0.134	0.330	0.247	0.381	0.190	0.348
Collaboration depth	0.026	0.076	0.046	0.103	0.036	0.091

Data source: Statistics Finland.

The correlations matrix in Table A4 shows that user consideration variables and the “users as an innovation source” variables do correlate to a limited degree. Furthermore especially user consideration and not users as an innovation source correlates heavily with clients and customers as a source of innovation. Surprisingly the correlation between user orientation variables and cooperation with clients and customers diminishes the more intensive the consideration of users becomes. The correlation between the client cooperation variable and the client as innovation source variable is relatively strong. Looking at the correlations between the variables of our regression analysis does not reveal any correlations higher than 0.5, except for the correlations between the R&D cooperation variables (0.75) and between the group and the size variables (0.52) (correlations not tabulated).

After this short description of the firms in sample and the introduction of our measures of user innovation the next section introduces the empirical set-up to analyse the role of user orientation for innovation and production output. The model will allow linking the self-reported importance of user orientation for innovation activities and for the production of innovative products to the real importance of user orientation for innovation and output performance.

3.2 Empirical model for user innovation and productivity

For the analysis of the relationship between user innovation and productivity we build on the CDM model (Crépon et al. 1998, Griliches 1979) that was fine-tuned for a set of OECD countries by Criscuolo (2009). This OECD core model described below allows for comparisons between multiple countries. The advantage of building on this core model will fully materialize when comparative user innovation data from Portugal and Switzerland will soon become available for comparative research (Kuusisto et al. 2014).

The CDM model is a structural model incorporating the innovation investment decision, the innovation process and the role of innovation in the production of output. It takes care both of selectivity, the fact that only a subset of firms engages actively in innovation activity, and endogeneity, due to the fact that some of the explanatory variables in the model might be simultaneously determined as the dependent variables.

Like the CDM, this model has three stages and consists out of four equations (see Criscuolo 2009). The first stage explains firms’ decision to engage in innovation activities, and the amount of innovation expenditure chosen. It is composed of two equations and it is estimated using a generalised Tobit model (Heckman, 1979).

The first equation accounts for firms’ innovative effort (*innov**) and can be formally written as follows:

$$Innov_i^* = X_i' \beta + u_i \quad (1)$$

Where the subscript *i* refers to firms; *X* is a vector of regressors described below and *u* is the error term that is assumed to be normally distributed. As firms will only innovate if the expected net gains from this activity are positive, the observation is a discrete event (innovative or not)¹¹⁴ rather than a latent variable *Innov**. Therefore, the first equation models the probability that the firm is innovating using a probit model:

$$Prob(Innov_i = 1) = Pr(Innov_i^* > 0) = Pr(u_i > -X_i' \beta)$$

Where *X_i* is a vector of variables affecting the innovation investment decision and includes: size of the firm, measured as log employment; a dummy for whether the firm is part of a group; a dummy for whether the firm is an exporter; a variable that captures the importance of obstacles to innovation due to knowledge, costs and market; and industry dummies. These variables are largely those used in previous CDM works (e.g., Crespi and Zúñiga, 2012)

¹¹⁴ An innovative firm is strictly defined as having positive (*x*>0) innovation expenditures and positive (*x*>0) innovative sales.

Conditional on the firm being innovative, one can observe the amount of investment and thus the intensity of investing in innovation. The second equation of the first stage is an innovation expenditure intensity equation, where the dependent variable is innovation expenditure per employee. It estimates the role of exogenous covariates on the amount of innovation expenditure:

$$\begin{aligned} InnExp &= X'_2 d + e_i & \text{if } Innov &= 1 \\ \text{and} & & & \\ InnExp &= 0 & \text{if } Innov &= 0 \end{aligned} \quad (2)$$

It is assumed that the error terms u and e are jointly normally distributed with mean zero and covariance ρ and the two equations are estimated as a generalised Tobit equation, by maximum likelihood. Additional regressors are used with respect to the first equation. In the second equation the vector of covariates X' includes a dummy for belonging to a group; a dummy for whether the firm is an exporter; a variable that captures R&D co-operation activities; and a dummy for public financial support. For the parameters of interest to be correctly identified, a crucial assumption is whether there are variables that affect the decision to invest in innovation but not the intensity of the innovation effort, *i.e.* whether exclusion restrictions exist. In this model the variables included in the first equation, but excluded from the second, are firm size and obstacles to innovation. The idea is that while it is well known in the literature that larger firms are more likely to invest in innovation (see for example Cohen and Klepper, 1996), the intensity of investing in innovation – measured as the ratio of total innovation expenditure per employee – is already scaled and therefore less likely to be correlated to size. Finally from this first step the inverse Mills ratio is estimated and used as an additional regressor in the second and third step of the model to control for selectivity. In addition the predicted value of innovation expenditure is calculated.

The second step consists of the estimation of the knowledge production function, where the dependent variable, log innovative sales per employee (selected by Criscuolo versus other alternatives such as the introduction of product and process innovation, Crespi and Zúñiga, 2012 or all different types of innovation as in Aboal and Garda 2012), depends on a vector of covariates X'_3 containing log employment; a dummy for SME's; a group dummy; a dummy for process, organisational and marketing innovation; a set of user orientation variables; a set of R&D co-operation variables and innovation source variables as to control for other incoming knowledge flows not due to user orientation; a set of innovation hampering measures; the Mills ratio; industry dummies; and actual log innovation expenditure per employee (or predicted values when correcting for potential endogeneity). Given that the model is estimated only on innovative firms, the Mills ratio, estimated in the first stage, is added to correct for selectivity. The identification restriction here is that public financial support only affects innovation outcomes through increased investment in innovation and, similarly, that – once one conditions for the co-operation activity of the firm – serving foreign markets (measured by export dummy) only affects innovation outputs through increased innovation expenditure.¹¹⁵ The innovation outcome equation can therefore be written as:

$$Innov_output = X'_3 g + v_i \quad (3)$$

In the third stage the innovation output productivity link is estimated using a Cobb-Douglas production function in our case augmented with measures of user orientation (Griffith et al. 2006).

$$\ln(\text{sales per employee}) = X'_4 p + v_i \quad (4)$$

The dependent variable is log sales per employee. The right-hand side variables are: firm size; a dummy for SME's; a group dummy; a dummy for foreign ownership; a dummy for process, organisational and marketing innovation; a set of user orientation variables; the Mills ratio, to correct for selectivity; and log innovative sales per employee. To account for the potential endogeneity of log innovative sales per employee, the output production function is estimated using instrumental variables 2-stage least squares (IV 2SLS). All variables used in the empirical set-up and their definitions are listed in table A2. The next section summarizes the results of the empirical analysis.

4 Results and robustness testing

The results of the CDM model variant described in the previous section will be presented by model stage. The focus in the description of the results will be on the role of user innovation for innovation output (stage 2) and production output (stage 3). To measure innovation output in the service sector researchers have often used simple innovation dummies (see for example Crespi and Zuniga 2011). However, because of the imprecision and noisiness of innovation dummies we use instead the share of sales of innovative products for measuring innovation output. The latter measure is useful for goods and services and gives a good indication of how important the innovation(s) were for the firm (see Hall 2011). We underline that at stage one the empirical model is estimated on the full sample while during subsequent stages it is estimated for the sample of innovator firms only.

¹¹⁵ The latter is a very strong assumption since one does not allow international technology transfer to have any other potential role than those arising through formal co-operation agreements.

4.1 Innovation expenditures equation with selection

In stage 1 of the CDM variant we estimated a full two equation model by maximum likelihood (see table A3). Recall from the previous section that the selection equation models the probability of having both positive innovation expenditures and innovative sales while the intensity equation models innovation expenditures per employee in logs. The results for the full sample confirmed the presence of selection, with a significant correlation coefficient of 0.3. This result also clearly holds for services but does not seem to hold for manufacturing. This result means that in case we unexpectedly observe innovation expenditures for a firm than the innovation expenditure intensity will be relatively high given its characteristics.

A glance at the innovation intensity equation learns that for services the selection appears to have biased the coefficients towards zero and that it affected the significance levels. For manufacturing the bias ran into the other direction but no effects on significance levels were detected (results of the independent equations not tabulated). For service (manufacturing) firms innovation intensity increases (falls) with firm size. Firms who receive subsidies of some kind tend to have higher innovation intensities as do firms that collaborate on innovation. Being part of a firm group only tends to return higher innovation intensities in the service sector. These results suggest financial frictions may be at play. Based on these explorative results of the selection issues we will use the predicted values of innovation intensity where appropriate (the expectation of innovation intensity conditional on the other firm characteristics). For analysing restricted samples of innovators we will include inverse Mill's ratios in our regressions to correct for selection.

4.2 Innovation output and user orientation

Table 4 shows results for two versions of the innovation output equation by industry, where innovation is defined as the log of sales of innovative products by employee. For each industry sample the table compares the regression results using actual innovation expenditures versus predicted innovation expenditures. To capture user orientation we use all available info from the survey by making a sum of all the answers to the user orientation questions scaled by the maximum score possible. The higher the score of this user orientation index (USERS), the more important user orientation is for the innovation activities of the firm.

Table 4. Second stage estimation: Innovation output equation, with user orientation index *USERS*.

Y=INNOVATION OUTPUT	SERVICES		MANUFACTURING		FULL SAMPLE	
VARIABLES	Actual IE ^a	Predicted IE	Actual IE	Predicted IE	Actual IE	Predicted IE
USERS	1.681*	1.738*	0.132	0.0529	0.651	0.551
	(0.873)	(0.897)	(0.770)	(0.795)	(0.595)	(0.616)
Log employment	-0.162	-0.408*	-0.177	-0.290	-0.180	-0.347**
	(0.207)	(0.208)	(0.209)	(0.203)	(0.144)	(0.140)
D(member of a group)	0.273	0.785**	0.113	0.185	0.254	0.447**
	(0.270)	(0.353)	(0.300)	(0.303)	(0.193)	(0.205)
D(process innovation)	-0.0002	-0.001	-0.0748	-0.0470	-0.004	0.0511
	(0.297)	(0.298)	(0.231)	(0.244)	(0.174)	(0.176)
D(organisational innovation)	-0.317	-0.302	0.498*	0.646**	0.178	0.253
	(0.255)	(0.259)	(0.254)	(0.269)	(0.175)	(0.186)
D(marketing innovation)	0.199	0.189	0.0616	0.0533	0.106	0.0696
	(0.273)	(0.270)	(0.217)	(0.231)	(0.170)	(0.174)
D(SME)	0.0542	-0.0612	-0.0004	-0.0321	0.005	-0.0753
	(0.499)	(0.508)	(0.352)	(0.370)	(0.262)	(0.270)
External search breadth	0.201	0.397	-1.022*	-0.738	-0.314	-0.0855
	(0.581)	(0.571)	(0.526)	(0.529)	(0.398)	(0.397)
External search depth	2.838***	3.379***	2.153**	2.736**	2.327***	2.848***
	(0.949)	(0.894)	(0.839)	(0.887)	(0.640)	(0.640)
Inward R&D cooperation	1.64	3.489*	0.04	0.333	0.504	1.062
	(1.598)	(1.910)	(1.035)	(1.063)	(0.813)	(0.887)
Outward R&D cooperation	-0.402	1.361	-0.149	0.308	-0.0514	0.873
	(1.699)	(1.767)	(1.108)	(1.207)	(0.914)	(1.024)
International R&D cooperation	0.503	1.526	0.322	0.438	0.47	0.869
	(1.671)	(1.739)	(0.807)	(0.844)	(0.695)	(0.687)
National R&D cooperation	-1.056*	-1.185*	-0.0115	-0.116	-0.508	-0.673*
	(0.617)	(0.601)	(0.465)	(0.471)	(0.348)	(0.351)
Cost hampering factors	-0.360	-0.807	-0.0102	0.145	-0.125	-0.145
	(0.497)	(0.512)	(0.516)	(0.545)	(0.354)	(0.364)
Knowledge hampering factors	-0.553	-0.974	-0.203	-0.220	-0.331	-0.404
	(0.800)	(0.810)	(0.664)	(0.686)	(0.498)	(0.508)
Market hampering factors	-0.763	-1.246*	-1.064*	-1.240*	-0.790*	-0.975**
	(0.650)	(0.716)	(0.620)	(0.675)	(0.437)	(0.473)
Inverse Mills ratio	-0.920	-2.270***	-1.200*	-1.471**	-0.912*	-1.353**
	(0.710)	(0.823)	(0.661)	(0.690)	(0.506)	(0.541)
IE (innovation expenditure per employee, in logs)	0.175**		0.307***		0.250***	
	(0.0732)		(0.0761)		(0.0532)	
IE_p (predicted innovation expenditure per employee, in logs)		-0.869*		0.0604		-0.178
		(0.443)		(0.232)		(0.204)
Observations	215	215	279	279	494	494
R-squared	0.342	0.333	0.249	0.177	0.275	0.228

Note: Coefficients and their standard errors are shown. The standard errors are robust to heteroskedasticity. Industries are included in all equations. Data source: Statistics Finland.

The table shows that user orientation tends to play a positive significant (albeit weak) role for the innovation output in the service sector but not in the manufacturing sector. We recall that for the UK Manufacturing sector Laursen and Salter (2006) found users to have a positive significance for the fraction of the firm's turnover related to new to the world market products and incrementally improved product but not for related turnover fractions of new to the firm products. However, their dummy proxy variable of users was actually based on the customer's as innovation source information. To control for other possible knowledge sources for innovation we included two general standard measures of openness, namely external sourcing breadth and depth. Results show that for Finnish firms it is not the breadth of external search but rather the depth of the external search that has a significant positive impact on innovation output. For R&D collaboration measures no clear significant effects were found. In the case of R&D intensity clear positive effects are found but they turn negative or insignificant once we controlled for endogeneity. A final result of interest is that organizational innovation tends to have a positive effect on innovation output in the manufacturing sector.

As we expect the intensity of the user interaction to play a role for its importance on innovation we created a set of new measures that we wanted to test. The first measure captures the user consideration stance of the firm (user consideration) while the second reflects the user innovation activities of the firm (user innovation). In addition, in a similar fashion as earlier innovation openness measures were computed, we calculated the breadth of user orientation

activities (user breadth) of the firm and the depth of those activities (user depth). Apart from the alternative sets of user orientation variables the regressions ran included the same controls as these in table 4.

Table A6.1 and A6.2 offer empirical evidence that user orientation strategies turn out to be significant in the service sector only. For services we observe user innovation to have a positive relationship with innovation output. However, in the case of user consideration the relationship turns out to be negative. Further it was found that for service firms it is the user breadth that has a positive significant relationship with innovation output, not the user depth. Table A6.3 shows that when single user orientation dimensions are considered, only the application of user feedback systems turns out to have a positive significant relationship with innovation output in the manufacturing sector. The next section looks at the results of the third stage of the applied CDM model.

4.3 Output production and user orientation

In the last part of the analysis we look at the productivity impacts of innovation activities and user orientation. Table 5 shows estimates of equation (4) for two alternative indicators of innovation activities: the actual and predicted innovation sales per employee as instruments for innovation output. Using the predicted probability instead of the actual innovation is more appropriate to account for possible endogeneity issues concerning knowledge inputs. Therefore we have instrumented the innovation output measure using inputs to innovation and other firm characteristics. Conventional variables such as capital, employment are included in each specification and usually their estimates are not much affected by the inclusion of innovation variables.

Table 5. Third stage estimation: Output production function, with user orientation index USERS.

Y=PRODUCTIVITY VARIABLES	SERVICES		MANUFACTURING		FULL SAMPLE	
	Actual IE	Predicted IE	Actual IE	Predicted IE	Actual IE	Predicted IE
USERS	-0.281 (0.441)	-0.395 (0.509)	-0.543* (0.285)	-0.522** (0.246)	-0.497* (0.258)	-0.462* (0.255)
Log capital per employee	0.0510*** (0.0137)	0.0527*** (0.0134)	0.0487*** (0.0109)	0.0523*** (0.0102)	0.0471*** (0.0076)	0.0470*** (0.0076)
Log employment	0.0322 (0.0890)	0.0483 (0.0864)	-0.0651 (0.0459)	-0.0621 (0.0520)	-0.008 (0.0512)	-0.020 (0.0497)
D(member of a group)	0.491*** (0.135)	0.468*** (0.137)	0.0459 (0.122)	0.096 (0.0883)	0.254*** (0.0872)	0.275*** (0.0858)
D(process)	-0.151 (0.154)	-0.167 (0.165)	-0.162** (0.0971)	-0.164** (0.0773)	-0.159* (0.0867)	-0.156* (0.0830)
D(organisational innovation)	0.0578 (0.144)	0.0717 (0.150)	-0.130 (0.106)	-0.0293 (0.0949)	-0.0245 (0.0867)	-0.0107 (0.0826)
D(marketing innovation)	0.0249 (0.127)	0.0073 (0.129)	-0.0723 (0.0865)	-0.0501 (0.0778)	-0.0181 (0.0770)	-0.009 (0.0745)
D(SME)	0.0897 (0.187)	0.0729 (0.202)	-0.163 (0.141)	-0.198* (0.116)	-0.0604 (0.111)	-0.0700 (0.106)
D(foreign ownership)	-0.152 (0.193)	-0.228 (0.176)	0.207** (0.0910)	0.229** (0.0923)	-0.0005 (0.0948)	0.0275 (0.0941)
Inverse Mills ratio	-0.301 (0.326)	-0.277 (0.316)	-0.288* (0.173)	-0.440*** (0.162)	-0.345* (0.171)	-0.371** (0.180)
LISPE (innovative sales per employee, in logs)	0.299** (0.129)	0.2222*** (0.0840)	0.409*** (0.0742)	0.225** (0.103)	0.325*** (0.0764)	0.270*** (0.0962)
Observations	215	215	279	279	494	494
R-squared	0.538	0.504	0.281	0.474	0.483	0.515

Data source: Statistics Finland.

Our results show that user orientation tends to negatively affect the productivity in manufacturing firms but that it has no significant effect for service firms. Innovation output has a robust positive effect on our productivity measure. The remaining variables in the productivity equations are fairly standard and not very affected by the choice of innovation variables. Capital intensity has a somewhat low coefficient, albeit still reasonable in light of the included industry dummies, which will tend to depress it. Process innovations have a negative impact on productivity in the manufacturing sector. However, unlike previous results productivity does not fall with firm size as log employment stays insignificant. Being part of a group has a positive impact on productivity for service firms as has being foreign owned for manufacturing firms.

Looking into more detailed measures of user orientation shows that the negative relationship between user orientation and productivity in the manufacturing sector is mainly driven by user innovation rather than by user consideration (Table A7.1). In addition it is the depth rather than the breadth of the user orientation that tends to exert a

significant impact. Interestingly, that impact is negative in the manufacturing sector and positive in the services sector (Table A7.2). A final results flows from the specification with individual user orientation measures for which the results are tabulated in Table A7.3. In the manufacturing sector it is the use of market studies, consumer panels, focus groups and interviews that have a positive relationship with productivity. Further measures turned out to be insignificant. However, the above results have to be interpreted with care as coefficients from different subsamples under investigation indicate a complex relationship and due to the relatively weak significant levels applying to small sample sizes. Results will be discussed after some extra robustness tests.

4.4 Robustness tests

To check how robust our presented first results are we plan to do a series of robustness tests.

Our CDM model variant follows the OECD core model of innovation and productivity (Criscuolo 2009) in defining an innovative firm as having both strictly positive innovation expenditures and innovative sales. An alternative less strict definition could be used that requires only positive innovation expenditures for a firm to be defined as innovative.

As comes to the measurement of innovation output we deliberately preferred the superior measure of sales of innovative products and services to simple innovation dummies. Nevertheless one could argue that the sales measure is too narrow as it does not capture organizational and marketing innovations for which user orientation could also play a role (e.g., impacts on non-technological innovations found for services in Aboal and Garda, 2012). One could indeed look at different kinds of innovation dummies but recent evidence from the literature indicates that here the use of only one broad innovation measure capturing product, process, organizational and marketing innovation maybe optimal (Hall et al. 2012).

A third set of robustness tests relate to alternative measures of the conventional productivity measure we use. Although widely used in CIS based research, the log of turnover per employee is only a rough proxy for productivity due to the role of intermediate inputs that vary greatly over industries. Therefore we will use instead the log of value added per employee as a measure of labor productivity (see Belderbos et al. 2004). It goes without saying that to take into account the time structure of the effects one should also check for alternative lags.

A last set of robustness tests relates to coping with the endogeneity issues. The CDM model is an appropriate structural model to build our analysis on as it takes into account the nature of the innovation process and pays attention to selection and endogeneity issues. The standard focus of the model and on the correction of biases is on how innovation inputs relate to innovation outputs and production outputs. Indeed, augmenting the model with user orientation variables does not automatically correct for additional potential endogeneity issues. Therefore additional attention is required to analyse the possible endogeneity of user orientation variables.

5 Discussion and conclusions

Our first results based on the Finnish unique set of data for 2010 show that user orientation seems to play a significant role for the innovation output in the service sector, confirming our first hypothesis. These results are not the same for each kind of service engagement. Individual user involvement variables do not report a particular significant effect. However, it is on the overall integration with users combining different ways when services firms get a higher impact on innovation, mainly with user innovation is pursued, not just user consideration. This result supports the previous theoretical (Gallouj, 2002, and Weinstein, 2007) and case study results (Sundbo and Toivonen, 2011) on strong role of users in service innovation when there is a strong involvement. In addition, no clear significant relationship was found between user orientation and innovation output in the manufacturing sector.

Regarding the second hypothesis, we confirm positive impacts of service innovation in service productivity as notices in previous work (Aboal and Garda, 2012) but we did not find significant evidence that user orientation would affect the productivity of service firms, at least when roughly measured by turnover per employee. Our results support this hypothesis for the service sector, according to the characteristics of services innovation and impacts on quality (Rubalcaba et al., 2010) and employment (Evangelista and Savona, 2003) in contexts of complex and non-visible transmission mechanisms between service innovation and service productivity (Djellal and Gallouj, 2013). At the other hand, results for the manufacturing sector show that user orientation tends to have a significant but negative impact on productivity. The interpretation of these results is challenging as complex relationships are at work and certainly also dynamics play their role. This key results show that the relationship of user orientation and firm level output measures is substantially different between service firms and manufacturing firms.

The user orientation profile of a firm can differ along several dimensions. In the context of innovation activities it is useful to distinguish between the more passive interaction between the user and the firm and the more intense or active interaction. Therefore we looked at user consideration versus users being active innovation sources or developers (co-innovators). We recall that our third hypothesis stated that more intense interaction profiles would have a stronger relationship with our output measures than more passive interactions. Our results support our hypothesis in that user innovation indeed turns out to be more significant than the more passive user consideration. But the relationship differs depending on the output measure. User innovation has positive relationship with innovation output in the service sector and a negative relationship with the production output measure in manufacturing. The services results may back the previous theoretical and case studies results for service innovation while the manufacturing results may be related to the

role of external sources for incremental innovation rather than for radical innovations (Windrum et al., 2013). Higher manufacturing innovation in terms of sales from innovation products may rely more on internal sources or other factors than on the users innovation that may be useful for incremental but less profitable innovations in manufacturing.

Turning to the aggregate role of different means of user orientation our analysis produces mixed results. User breadth has a significant positive relationship with innovation output in the service sector while user depth has a negative relationship with production output in the manufacturing sector. The mixed evidence does not support our hypothesis 4. When detailed means of user orientation are considered it was found that the feedback of users and the market studies turned out to have a positive impact on output in the manufacturing sector. Overall our results show the complex relationship between different dimensions of user orientation and that practices and channels differ substantially between services and manufacturing firms, but not in what we expected from previous literature on breadth and depth (the relationships do not follow Larsen and Saulter 2006 or Battisti et al 2014).

As overall conclusion, new empirical evidence from the Finnish survey on user's role in innovation proves their importance for innovation products, but not whatever kind of user's role. Impacts are significant when there are right combinations of user orientation and active involvement, so some sort of user innovation is produced even at a preliminary phase of the innovation process. The manufacturing sectors hold higher shares of companies engaging users in their innovation activities, and users innovation is more visible from descriptive statistics, but impacts from users into innovation are not significant according to the CDM model, what may suggest the higher role of other external and internal sources in goods innovation performance. Although we have found positive impacts from innovation outputs on productivity, the role of users is not directly linked to productivity gains in a significant way.

The limitation of our current analysis boils down to the fact that some of our results on user orientation have to be interpreted as associations rather than as effects. Additional robustness test will have to be focusing on correcting for endogeneity issues.

Further research should compare the Finnish results with results for other countries. In the near future data will become available of innovation surveys from Portugal and Switzerland that have incorporated the unique Finnish user orientation question from the CIS 2010 survey. We argued that the CDM model set-up we used would be a fruitful start for further cross-country comparative analysis.

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Appendix

Table A1. Description of variables used in the regression analysis.

No	Variable name	Definition
Potentially endogenous variables		
1	Innovator	Firm has strictly positive innovation expenditures and strictly positive innovation sales (binary)(from CIS)
2	Innovation intensity (IE)	log innovation expenditure per employee (from CIS)
3	Innovation output (LISPE)	Log innovation sales per employee (from CIS)
4	Productivity	Log turnover per employee (from business register)
5	Productivity (second measure)	Log value added per employee (value added from financial statement statistics, employment from business register)
6	process innovation	The firm reported a process innovation for the period 2008-2010 (binary).
7	organisational innovation	The firm reported an organisational innovation for the period 2008-2010 (binary).
8	marketing innovation	The firm reported a marketing innovation for the period 2008-2010 (binary).
Exogenous variables		
Firm general characteristics		
	Log employment	Log employment (business register)
	SME	Small or medium sized company (binary)(business register)
	Industry	TOL2008 one digit industries (binary)(business register)
	Exporting	firm active in international market (binary variable)(business register)
	Public support	firm received financial support from government for innovation (CIS)
	Group	Firm is part of a larger organization (binary) (CIS)
	Foreign	Foreign-owned enterprise (business register)
Firm innovative capabilities		
<i>Detailed user orientation variables</i>		
	Feedback	<i>Use of customer feedback systems</i> has been of medium to high importance for the innovation activities and the production of innovative products in the 2008 to 2010 period (binary)(CIS)
	Market studies	<i>Use of market studies, consumer panels, focus groups and interviews</i> have been of medium to high importance for the innovation activities and the production of innovative products in the 2008 to 2010 period (binary)(CIS)
	Survey needs	<i>Surveying of user needs by research methods</i> have been of medium to high importance for the innovation activities and the production of innovative products in the 2008 to 2010 period (binary)(CIS)
	Ideas	<i>Development forums and platforms to collect ideas from users and user communities</i> have been of medium to high importance for the innovation activities and the production of innovative products in the 2008 to 2010 period (binary)(CIS)
	Product adaptation	Customers and user moulding of existing products that your firm developed, produced and commercialised has been of medium to high importance for the innovation activities and the production of innovative products in the 2008 to 2010 period (binary)(CIS)
	New products	Customers and user development of new products that your enterprise produced and commercialised has been of medium to high importance for the innovation activities and the production of innovative products in the 2008 to 2010 period (binary)(CIS)
<i>General user orientation strategy measures</i>		
	User innovation	The answers on how important feedback, market studies, survey needs, ideas, product adaptation and new products are to the innovative activities of the firm (3 high, 2 medium, 1 low or 0 not used) bundled into one sum divided by the maximum possible score 18.
	User consideration	The answers on how important feedback, market studies and survey needs are to the innovative activities of the firm (3 high, 2 medium, 1 low or 0 not used) bundled into one sum divided by the maximum possible score 9.
	User innovation	The answers on how important ideas, product adaptation and new products are to the innovative activities of the firm (3 high, 2 medium, 1 low or 0 not used) bundled into one sum divided by the maximum possible score 9.

	User breadth	If one of the 6 above detailed measures of user orientation has been used by the firm it is scored one otherwise zero, after which the sum of all scores is made and divided by 6.
	User depth	If one of the 6 above detailed measures of user orientation is of high importance to the firm it is scored one otherwise zero, after which the sum of all scores is made and divided by 6.
<i>Other innovative capabilities of the firm</i>		
	Cost hampering factors	Sum of the importance (3 high, 2 medium, 1 low, 0 not relevant) of cost hampering factors divided by maximum possible score (CIS)
	Knowledge hampering factors	Sum of the importance (3 high, 2 medium, 1 low, 0 not relevant) of knowledge hampering factors divided by maximum possible score (CIS)
	Market hampering factors	Sum of the importance (3 high, 2 medium, 1 low, 0 not relevant) of market hampering factors divided by maximum possible score (CIS)
	Total hampering factors	Sum of the importance (3 high, 2 medium, 1 low, 0 not relevant) of cost, knowledge and hampering factors divided by maximum possible score (CIS)
	Cooperation index	Sum of all cooperation dummies by location divided by maximum possible score 42.
	Inward R&D cooperation	Sum of cooperation dummies for all locations of competitors, clients, suppliers and other firms within the group by maximum possible score 24.
	Outward R&D cooperation	Sum of cooperation dummies for all locations of consultants, universities and polytechnics and government and public research institutes divided by a maximum possible score of 18.
	National R&D cooperation	Sum of all domestic cooperation dummies by location divided by maximum possible score 7.
	International R&D cooperation	Sum of all international cooperation dummies by location divided by maximum possible score 35 divided by the total cooperation index.
	External search breadth	If one of the sources of innovation has been used by the firm it is scored one otherwise zero, after which the sum of all scores is made and divided by the total amount of innovation sources 11.
	External search depth	If one of the sources of innovation is of high importance to the firm it is scored one otherwise zero, after which the sum of all scores is made and divided by the total amount of innovation sources 11.
<i>Production factors and prior productivity measures</i>		
	Capacity	Log capital per employee (capital from the financial statement statistics and employment from the business register)

Table A2. Descriptive statistics of innovative firms (firms with strictly positive innovation expenditures and innovative sales).

SAMPLE	Services 216 obs.		Manufacturing 279 obs.		Full sample 495 obs.	
VARIABLE	Mean	S.D.	Mean	S.D.	Mean	S.D.
Firms that performed R&D	0.94	0.25	0.98	0.16	0.96	0.20
Firms with product innovation	1.00	0.00	1.00	0.00	1.00	0.00
New to the market	0.63	0.48	0.72	0.45	0.68	0.47
New to the firm	0.73	0.44	0.78	0.42	0.76	0.43
Firms with process innovation	0.76	0.43	0.71	0.45	0.73	0.44
Firms with organizational innovation	0.74	0.44	0.67	0.47	0.70	0.46
Firms with marketing innovation	0.66	0.47	0.65	0.48	0.65	0.48
Expenditure on innovation (in 1000 EURO)	2 023	7 651	15 277	140 091	9 493	105 419
Innovation intensity (% turnover)	0.11	0.25	0.05	0.08	0.08	0.18
Innovation expenditures by employee (in 1000 EURO)	17	42	13	22	15	32
Turnover from product innovations	0.218	0.245	0.186	0.204	0.200	0.223
Capital intensity (capital by employee, in 1000 EURO)	75	149	368	2 365	240	1 784
Labor productivity (turnover by employee)(in 1000 EURO)	333	820	304	352	317	602
Labor productivity (value added by employee) (in 1000 EURO)	71	58	75	81	73	72
Number of employees	278	1 288	415.976	1158.698	355.705	1217.556
SME	0.82	0.39	0.66	0.48	0.73	0.45
Turnover (in 1000 EURO)	63 632	174 700	248 000	1 431 000	167 600	1 083 000
Age	19.9	19.3	22.6	21.0	21.4	20.3
Firms within a group	0.58	0.50	0.65	0.48	0.62	0.49
Firms receiving public support	0.38	0.49	0.62	0.49	0.52	0.50
International markets	0.35	0.48	0.88	0.33	0.65	0.48
Cooperated	0.51	0.50	0.66	0.48	0.59	0.49
Cooperation (index)	0.11	0.14	0.18	0.19	0.15	0.17
Inward cooperation (index)	0.12	0.17	0.21	0.23	0.17	0.21
Outward cooperation (index)	0.08	0.12	0.14	0.17	0.12	0.15
Co-operated with foreign partners (Int. coop as share of total c	0.06	0.11	0.13	0.15	0.10	0.14
National cooperation (index)	0.36	0.40	0.48	0.40	0.42	0.40
Cost-based obstacles for innovation	0.43	0.28	0.48	0.27	0.46	0.27
Knowledge obstacles for innovation	0.39	0.21	0.43	0.21	0.41	0.21
Market obstacles for innovation	0.42	0.23	0.44	0.21	0.43	0.22
Total obstacles for innovation	0.41	0.20	0.45	0.18	0.43	0.19

Data source: Statistics Finland.

Table A3. Descriptive statistics of the user orientation variables for the innovative firms (firms with strictly positive innovation expenditures and sales of innovative products and services).

SAMPLE	Services 216 obs.		Manufacturing 279 obs.		Full sample 495 obs.	
VARIABLE	Mean	S.D.	Mean	S.D.	Mean	S.D.
CATEGORIES OF USER ORIENTATION (dummies)						
USER CONSIDERATION						
Feedback (dummy)	0.69	0.46	0.71	0.45	0.70	0.46
Market studies (dummy)	0.45	0.50	0.48	0.50	0.47	0.50
Survey needs (dummy)	0.36	0.48	0.36	0.48	0.36	0.48
USER INNOVATION						
Ideas (dummy)	0.33	0.47	0.25	0.43	0.29	0.45
Product adaptation (dummy)	0.37	0.48	0.39	0.49	0.38	0.49
New products (dummy)	0.20	0.40	0.17	0.37	0.18	0.38
SUMMARY MEASURES OF USER ORIENTATION						
Total user orientation index	0.26	0.137	0.252	0.142	0.256	0.140
User consideration index	0.475	0.252	0.475	0.268	0.475	0.261
User innovation index	0.306	0.267	0.28	0.26	0.292	0.297

Data source: Statistics Finland.

Table A4. Correlations between the user orientation, the client cooperation and client as innovation source variables for the full sample.

	A.	B.	C.	D.	E.	F.	G.	H.
A. Customer feedback systems	1							
B. Market studies	0.6517	1						
C. Surveying user needs	0.5435	0.5895	1					
D. Users as a resource of innovation activities	0.4665	0.5015	0.5427	1				
E. Market intro of existing product moulded by users	0.4759	0.3901	0.403	0.5054	1			
F. Market intro of new product developed by users	0.3635	0.3067	0.3411	0.4834	0.6724	1		
G. Cooperation with clients and customers	0.4259	0.4342	0.3686	0.3801	0.3651	0.2746	1	
H. Clients as a source for innovation	0.6028	0.5077	0.4527	0.4329	0.4964	0.3753	0.5958	1

Data source: Statistics Finland: CIS(2010)

Table A5. CDM model first stage estimation of probability and intensity of innovation expenditure (Heckman selection model (Heckman 1979) or Tobit type II model (Amemiya 1984)).

SAMPLE SELECTION MODEL				
	SAMPLE	Services	Manufacturing	Full sample
VARIABLE				
Selection (probability of spending on innovation and having innovative sales)				
Log employment		0.183***	-0.229***	0.213***
		(0.0480)	(0.0573)	(0.0355)
D(member of a group)		-0.0226	0.0398	0.00495
		(0.117)	(0.127)	(0.0849)
D(exporting)		0.570***	0.586***	0.577***
		(0.143)	(0.133)	(0.0966)
Hampering factors		1.294***	1.138***	1.203***
		(0.205)	(0.223)	(0.149)
Intensity (log amount spend on innovation per employee)				
D(member of a group)		0.499*	0.0313	0.316*
		(0.256)	(0.228)	(0.171)
D(exporting)		0.472	0.147	0.356
		(0.340)	(0.390)	(0.249)
D(Public financial support)		0.525*	0.898***	0.736***
		(0.277)	(0.204)	(0.170)
Co-operation in R&D (index)		3.254***	1.966***	2.432***
		(0.983)	(0.544)	(0.518)
Correlation coefficient		0.435*** (0.025)	0.002 (0.9954)	0.305** (0.0604)
Number of observations (nonzero)		1030 (215)	1027(279)	2057 (494)
Loglikelihood		-3042.724	-3013.63	-6081.369

Note: Coefficients and their standard errors are shown. The standard errors are robust to heteroskedasticity. Industries are included in all equations. Data source: Statistics Finland.

Table A6.1. Second stage estimation: Innovation output equation, with user consideration index and user innovation index.

Y=INNOVATION OUTPUT	SERVICES		MANUFACTURING		FULL SAMPLE	
VARIABLES	Actual IE	Predicted IE	Actual IE	Predicted IE	Actual IE	Predicted IE
USER CONSIDERATION	0.0748 (0.556)	0.16 (0.575)	0.305 (0.438)	0.426 (0.440)	0.167 (0.334)	0.188 (0.344)
USER INNOVATION	0.949** (0.381)	0.914** (0.398)	-0.183 (0.380)	-0.334 (0.413)	0.26 (0.283)	0.18 (0.305)
R-squared	0.347	0.337	0.251	0.182	0.275	0.228
Observations	215	215	279	279	494	494

Data source: Statistics Finland.

Table A6.2. Second stage estimation: Innovation output equation, with user breadth and user depth measures

Y=INNOVATION OUTPUT	SERVICES		MANUFACTURING		FULL SAMPLE	
VARIABLES	Actual IE	Predicted IE	Actual IE	Predicted IE	Actual IE	Predicted IE
USER BREADTH	1.082** (0.423)	0.987** (0.421)	-0.0463 (0.385)	-0.0210 (0.394)	0.475* (0.282)	0.436 (0.283)
USER DEPTH	-0.446 (0.527)	-0.256 (0.557)	0.047 (0.591)	-0.0553 (0.601)	-0.363 (0.408)	-0.402 (0.432)
R-squared	0.352	0.339	0.249	0.177	0.278	0.232
Observations	215	215	279	279	494	494

Table A6.3. Second stage estimation: Innovation output equation, with all 6 user orientation dummies (medium to high importance).

Y=INNOVATION OUTPUT	SERVICES		MANUFACTURING		FULL SAMPLE	
VARIABLES	Actual IE	Predicted IE	Actual IE	Predicted IE	Actual IE	Predicted IE
D(USER1: feedback)	0.362 (0.267)	0.293 (0.263)	0.544** (0.229)	0.580** (0.238)	0.472*** (0.168)	0.439** (0.173)
D(USER2: market studies)	-0.134 (0.272)	0.0161 (0.275)	-0.160 (0.221)	-0.134 (0.244)	-0.180 (0.160)	-0.101 (0.172)
D(USER3: survey needs)	0.074 (0.269)	0.103 (0.259)	-0.0696 (0.207)	-0.0659 (0.231)	0.0046 (0.162)	-0.001 (0.170)
D(USER4: ideas)	0.0911 (0.310)	0.0784 (0.297)	-0.153 (0.237)	-0.0436 (0.245)	0.0184 (0.186)	0.0555 (0.191)
D(USER5: product adaptation)	0.125 (0.319)	0.141 (0.322)	0.0794 (0.227)	0.0551 (0.229)	0.0869 (0.175)	0.101 (0.182)
D(USER6: new products)	0.237 (0.362)	0.161 (0.349)	-0.0239 (0.259)	-0.215 (0.265)	0.0171 (0.201)	-0.119 (0.207)
R-squared	0.345	0.332	0.277	0.207	0.291	0.242
Observations	215	215	279	279	494	494

Data source: Statistics Finland.

Table A7.1. Third stage estimation: Production output equation, with user consideration index and user innovation index.

Y=PRODUCTIVITY	SERVICES		MANUFACTURING		FULL SAMPLE	
VARIABLES	Actual IE	Predicted IE	Actual IE	Predicted IE	Actual IE	Predicted IE
USER CONSIDERATION	0.0955 (0.227)	0.0846 (0.242)	-0.00736 (0.163)	0.126 (0.154)	0.01 (0.143)	-0.462* (0.142)
USER INNOVATION	-0.257 (0.216)	-0.327 (0.246)	-0.337** (0.160)	-0.443*** (0.163)	-0.321** (0.134)	-0.319** (0.132)
R-squared	0.562	0.536	0.313	0.492	0.494	0.521
Observations	215	215	279	279	494	494

Data source: Statistics Finland.

Table A7.2. Third stage estimation: Production output equation, with user breadth and user depth measures.

Y=PRODUCTIVITY	SERVICES		MANUFACTURING		FULL SAMPLE	
VARIABLES	Actual IE	Predicted IE	Actual IE	Predicted IE	Actual IE	Predicted IE
USER BREADTH	-0.286 (0.210)	-0.354 (0.236)	-0.0494 (0.161)	-0.115 (0.135)	-0.228* (0.131)	-0.216* (0.126)
USER DEPTH	0.417* (0.231)	0.438* (0.230)	-0.425** (0.199)	-0.321* (0.174)	-0.0310 (0.162)	-0.0249 (0.160)
R-squared	0.566	0.545	0.257	0.471	0.488	0.52
Observations	215	215	279	279	494	494

Data source: Statistics Finland.

Table A7.3. Third stage estimation: Production output equation, with all 6 user orientation dummies (medium to high importance).

Y=PRODUCTIVITY	SERVICES		MANUFACTURING		FULL SAMPLE	
VARIABLES	Actual IE	Predicted IE	Actual IE	Predicted IE	Actual IE	Predicted IE
D(USER1: feedback)	0.0845 (0.142)	0.0496 (0.143)	-0.160 (0.106)	-0.0474 (0.104)	-0.0354 (0.0947)	-0.0121 (0.0983)
D(USER2: market studies)	-0.0308 (0.135)	-0.0248 (0.135)	0.207** (0.0813)	0.200*** (0.0690)	0.0837 (0.0773)	0.0807 (0.0753)
D(USER3: survey needs)	-0.00302 (0.117)	-0.0120 (0.118)	0.0077 (0.0877)	-0.0013 (0.0768)	-0.0203 (0.0719)	-0.0184 (0.0718)
D(USER4: ideas)	-0.0855 (0.113)	-0.118 (0.121)	-0.120 (0.0982)	-0.122 (0.0802)	-0.112 (0.0713)	-0.105 (0.0684)
D(USER5: product adaptation)	0.0902 (0.106)	0.0888 (0.114)	-0.0984 (0.0882)	-0.0969 (0.0738)	-0.0168 (0.0657)	-0.0144 (0.0635)
D(USER6: new products)	-0.240 (0.170)	-0.251 (0.173)	-0.105 (0.102)	-0.157 (0.0957)	-0.145 (0.0976)	-0.155 (0.0968)
R-squared	0.568	0.536	0.342	0.504	0.494	0.521
Observations	215	215	279	279	494	494

Data source: Statistics Finland.

Societal challenges in the back office of farm advisory services: the case of pesticides use reduction in the French seed potato industry

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INRA-UMR SAD-APT

This paper examines how agricultural advisory service organizations such as Knowledge Intensive and Business Services (KIBS) generate the knowledge needed by farmers to reduce the use of pesticides. A case study was conducted within the French seed potato industry based on structured interviews with advisory organizations that supply different forms of KIBS and are involved in the production of knowledge with farmers. The results show how societal issues related to the reduction of pesticide use are taken into account in these different forms of KIBS. We conclude that the numerous investment rationales in the back offices of KIBS tend to better integrate market information than the societal challenges associated with a sustainable use of pesticides.

Introduction

The agricultural development model based on intensified production techniques with high levels of chemical inputs, especially pesticides (phyto-pharmaceutical products), has been strongly challenged since the 1990s. As the harmful effects of pesticides on human and animal health (e.g. certain cancers, skin conditions, etc.) and on the environment (air and water pollution, effects on fauna and flora) have been shown, several regulations have been passed and initiatives taken to promote the sustainable use of pesticides in the EU and its Member States.

Directive 2009/128/EC specifies that national plans to manage and reduce the risks of pesticide use must be established in every Member State. The States must facilitate the adoption of integrated farming methods and must take measures "to reduce risks and impacts of pesticide use on human health and the environment and to encourage the development and introduction of integrated pest management and of alternative approaches or techniques in order to reduce dependency on the use of pesticides". These plans, which are intended to promote the development of measures to reduce pesticide use, require several types of intervention: regulations, control, advisory services, and training. Article 5 of Directive 2009/128/EC emphasizes the fact that the aim is both: (i) to guarantee access to training: "Member States shall ensure that all professional users, distributors and advisors have access to appropriate training by bodies designated by the competent authorities" and (ii) to set up a system to certify that advisors, farmers and users have access to all the information needed for their activity.

This emphasis on the role of advisory services is consistent with a more general goal of the European Commission, which is to improve the offer of Farm Advisory Services in the Member States (Regulation (EC) no 73/2009 of the Council).

In France, European regulations concerning pesticides have been incorporated into a specific action programme (Ecophyto 2018) funded by a pesticide tax. Several objectives of this programme specifically concern knowledge production to meet challenges in terms not only of outputs and income, but also of health and the environment.

Yet the scope of these actions is still limited and the various public- and private-sector advisory organizations are expected to contribute directly to the production and dissemination of knowledge to meet the goal of pesticide reduction. Are the advisory service providers meeting these expectations?

We will see in the first section that agricultural advisory services are knowledge-intensive business services (KIBS) which can come in various forms. The research presented here focuses on a particular case study, the seed potato industry (Section 2), and studies the performance strategies of thirteen advisory organizations in France, corresponding to different forms of KIBS (Section 3). The results show how the societal issues related to the reduction of pesticide use are taken into account in these different forms of KIBS (Section 4).

1 Understanding the strategies of organizations that invest in KIBS

1.1 Agricultural advisory services are KIBS

By definition, knowledge-intensive business services (KIBS) are services in which knowledge production is the most important component. Gallouj (2010: 105) defines KIBS as "activities whose knowledge is both input and output", while Miles (1995: 18) defines KIBS as "services that involve economic activities which are intended to result in the creation, accumulation or dissemination of knowledge". Bettencourt et al. (1999: 100) define them as "firms whose primary value-added activities consist of the accumulation, creation, or dissemination of knowledge for the purpose of developing a customized service or product solution to satisfy the client's needs".

Our findings on agricultural advisory services converge with this theoretical definition. Labarthe et al. (2013, 11) define the agricultural advisory sector as "the entire set of organizations that will enable farmers to co-produce farm-level solutions by establishing service relationships with advisers so as to produce knowledge and enhance skills".

According to this definition, agricultural advisory services are provided by organizations that, with farmers, co-produce solutions to problems relating to the productive, sanitary, and/or environmental objectives of their farm activity. Their advice helps farmers to comply with the regulations and to change their practices, by providing them with adequate knowledge relevant to their farming conditions. As the aim of advisory services is to produce and coproduce knowledge with and for farmers, they clearly are KIBS.

Several authors have highlighted the diversity of kinds of knowledge used in KIBS (Muller and Zenker, 2001): diversity in the nature of knowledge (tacit, codified, mixed), in its sources (external, internal, organizational, individual), and in its domain of specialisation (economic, technical, etc.). To respond adequately to the client's request, advisory organizations must combine internal and external knowledge, tacit and codified knowledge, knowledge particularly relevant to the client's problem, and so on. These combinations stem from a highly interactive relationship between the KIBS and their clients (Muller and Zenker, 2001; Den Hertog, 2002; Muller and Doloreux, 2009; Strambach, 2010; Rodriguez, 2013) but also require knowledge processing skills.

KIBS are thus caught in a dialectic between the need to contextualize knowledge in order to solve specific problems, and the necessity to capitalize on codified and validated knowledge (Toivonen, 2004). This twofold necessity is found in the distinction between front and back office. Front-office work is performed in the beneficiary's presence and involves the co-construction of the request and/or of the response. Back-office work standardizes the service offer, gathers and includes scientific and technology monitoring, advisors' training, the storage of technical reference (construction and use of databases, etc.), and even the production of original knowledge (through experiments and R&D).

We find this combination of activities and types of knowledge in agricultural advisory services. To solve a farmer's problem, for example an outburst of mildew (a disease of potatoes), advisors need specific knowledge that is relevant to this particular situation (the climatic conditions of the farm, the farmer's previous practices in every field, etc.) as well as more general technical and scientific knowledge on diseases, methods to control them, cropping techniques, etc. They will thus base their action on knowledge related to a wide range of subjects, such as pesticide regulations, economic knowledge on crop management, and so on. Faced with certain problems, the transfer of available codified knowledge may not be sufficient, and the advisor will be asked to help the farmer to develop new skills. This will involve the integration, into the advisory service, of tacit knowledge related to the farmer's know-how, experience, practices, etc. As in KIBS generally, the distinction between front and back office is therefore very important.

Over the past few years the range of organizations providing farm advisory services has grown: chambers of agriculture, consultancy firms, producer organizations, upstream or downstream industries, etc. As a result, a part of the service offer is provided no longer by traditional service providers but by organizations proposing advisory services associated with the purchase of farming inputs or technologies (seeds, fertilizers, pesticides, GPS, etc.). Front- or back-office activities are thus combined differently, depending on the type of service provider and their strategies.

1.2 Towards a typology of KIBS specific to agricultural advisory services

Several classifications of services have been put forward (Miles et al., 1995; Evangelista and Savona, 2003; Hollestein, 2003). Miles et al. (1995) propose a taxonomy based notably on the link between technologies and the service delivered:

- P-KIBS (traditional professional services): services based on specific occupational skills. These include firms providing services such as consultancy, marketing, training, management and accounting, as well as legal, environmental and certain financial services.
- T-KIBS (new technology-based services): services related to information and communication technologies (ICT) and to the technical activities connected to these technologies. This includes firms providing certain telecommunication services, software and other information technology-related services (e.g. equipment management), training in new technologies, and so on.

Yet this taxonomy centred on firms seeking to make profits by developing a service offer does not allow for all types of service provider investing in agricultural advisory services to be included. We need to add (Table 1):

- Embedded or Integrated KIBS (E-KIBS or I-KIBS) (Barcey and Bonamy 1999, Djellal and Gallouj, 2010) developed primarily as a secondary service to accompany a commercial activity concerning a good: sale of inputs to farmers, or collection of their production. The main objective of these services is to improve the sale of goods (quantity, quality) by providing farmers with related services. These services may be proposed by private firms or cooperatives, and are currently growing fast.
- Client-owned KIBS (C-KIBS): services offered by farmers' associations or enterprises owned by the farmers. The aim is to provide services that solve clients' problems or improve the performance of members' farms, without seeking any other form of profit. The beneficiaries of these services belong to the association, to which they pay a membership fee. This contribution is a collective investment of farmers in advisory activities (both front and back office).

Facing different constraints, these different types of KIBS may have different economic behaviours. An analytical framework is proposed to analyse the strategies of these different types of advisory service providers.

1.3 Understanding service providers' strategies

Academic debates on performance measurement of services abound. They focus primarily on the limitations of traditional productivity measurement and aim at analyzing the relations between service production and the means necessary for its delivery. Indeed the productivity and growth indicators used in industry do exclude several dimensions of service firms' performance (Gadrey, 1996; Djellal and Gallouj, 2008, 2010, 2012; Du Tertre, 2010), for instance those linked to the co-production of services. However, productivity improvement is still part of the strategy of the service providers, as attested for example by the efforts to standardize the services (Gadrey, 1994). This tension is also found in agricultural advisory services, which may be standardized (collective advice, production of standardized decision tools, etc.) or alternatively be considered as an activity that is typically rooted in a face-to-face relationship. These issues are the subject of general debate on the analysis of service activities: should we develop an assimilation perspective (by using the same analytical frameworks as those used in industry) or rather a demarcation perspective (by developing specific frameworks), or else an integration perspective (Gallouj, 2010). The latter perspective has led to the creation of multi-criteria frameworks for analysing the performance of KIBS, which facilitates our understanding of these service providers' strategies: *"the idea is that, in services to a greater extent than elsewhere, performance cannot be captured solely through the notion of productivity"* (Gallouj, 1999).

The analysis of agricultural advisory services' performance requires us to take into account objects not only in the economic world but also in the environmental, regulatory, social and industrial worlds. *"Dealing directly with the difficulty of representing the product of a service activity such as advisory services requires one to recognize that there are various types of service production, and that the product is not a technical reality per se, but results from a social construction"* (Labarthe, 2006). Therefore, various authors have pointed out (Djellal and Galouj, 2010, 2012; Labarthe, 2006; Labarthe et al., 2013; Viitamo and Toivonen, 2013; Janeschek et al., 2012) that a multicriteria analysis seems to be the most appropriate method for analyzing advisory services' performance strategies.

2 Survey and framework for analyzing the strategies of advisory services in the seed potato industry

This study explores the ways in which societal issues (i.e. societal demands to reduce pesticide use) influence the performance strategies of agricultural advisory organizations in different types of KIBS. In order to secure the accuracy of the empirical evidence collected for the research, we chose to focus the analysis on a case study, the seed potato industry in France. This production was chosen for three reasons:

- The sanitary quality of the seeds is a priority, to protect the farmers' crops and to comply with international trade regulations in the industry.
- The seed potato industry is subject to high risks of parasites that can cause the entire crop to be lost. Farmers therefore use high levels of pesticides (the "Treatment Frequency Index" is very high). Hence 1) the decrease of the amount of pesticides used may generate specific risks and demand for farm advice; 2) it is a sensitive area for societal issues related to pesticides.
- Various types of actor are involved in providing advice in this industry (producer organizations, chambers of agriculture, pesticide firms, potato seed companies, etc.).

The different types of farm advisory service providers were identified through an analysis of the supply chain, and a snowball sample methodology. The main ones were interviewed, i.e.:

- "Producers' organizations" (PO), to which all seed potato producers have to belong. There are three PO in France: one for producers in the Nord-Pas-de-Calais, Upper Normandy, Picardie, Champagne-Ardenne and Île de France regions; a second for producers in the Centre region; and a third for producers in Brittany. They provide advisory services to members and are funded primarily by producers' membership fees.
- "Potato seeds companies", which are private-sector firms producing and commercializing potato seeds. They have contracts with the farmers producing seed potatoes.. They offer advisory services free of charge to these farmers, to ensure that they use recommended practices to secure the quantity and quality of potato seeds production.
- "Chambers of agriculture", which are para-state advisory services financed by public and private funds. The service may be free of charge or not, depending on the case.
- "Centers for agricultural studies", which are collective organizations (or clubs) funded by the farmers and which enable them to receive advisory services.
- "Firms producing pesticides and fertilizers", which are private-sector businesses that combine advisory services with the sale of products.
- "Independent advisory bodies", which are private consultancy firms commercializing services to farmers. They are financed exclusively by the sale of these services.

The analysis presented here is based on surveys conducted with a semi-structured questionnaire that included:

- A general description of the organization (date of creation, status, membership numbers, etc.)
- A description of the advisory service offer (number of advisors, format and modality of service, themes, number of clients, etc.)
- An analysis of the back-office configuration (back-office activities, team, themes, governance, etc.).

All the interviews were transcribed in full and used to fill in an analysis framework that enabled us to understand the advisory organizations' performance strategies as well as the orientation of their back-office investments. This framework was inspired by the work of Gallouj (1999) and Labarthe (2006). Five dimensions of advisory service performance are considered: the financial, technical, relational, innovation, and civic dimensions (see Table 1).

- The financial dimension is related to the profitability of the firm's advisory services. It analyzes the added value of advisory services and its generation.
- The technical dimension relates to the optimization of the advisors' productivity. The indicators used to evaluate performance here are: productivity of advisory services in terms of time (number of farmers/advisors), of surface area (surface areas cultivated/advisors) and of quantity (quantity of potato seeds sold/advisors); level of standardization (standardized/personalized message); and rate of dysfunctioning (advisory service evaluation system).
- The relational dimension focuses on the relationship between the advisor and the farmer. Through this relationship the farmer's problem can be defined clearly and his/her needs met adequately. The service quality depends on the quality of the relationship, and is guaranteed by the personalization of the advisory services offer. The evaluation indicators adopted to analyze this dimension are: personalization (frequency of visits, duration of visits), client loyalty (producer turnover, advisor turnover), nature of the contract (standard, personalized).
- The innovation dimension is centred on the back office. It examines the firm's capacity to invest in knowledge acquisition and production and renewal, and analyzes the back-office activities (R&D, training, etc.), the human and material resources deployed, the themes, etc.
- The civic dimension analyzes the firm's capacity to integrate the values of equity or societal issues.

These performance dimensions cannot be thought of independently; there are synergies and contradictions between them. A cross-cutting analysis of all five enabled us to identify the service providers' strategies and to present them synthetically. In particular, it furthered our understanding of the choices that are made by different types of service provider in the distribution of the activities and the investments between front- and back-office.

3 Results

The research enabled to analyze the performance logics of each of the four types of advisory service: C-KIBS (client-owned KIBS: producers' organizations), E-KIBS (embedded KIBS: services proposed by seed companies), T-KIBS (technological KIBS, in these cases companies selling software or using decision support technologies for farmers) or P-KIBS (professional KIBS, in these cases chambers of agriculture and private consultants). Each strategy is illustrated by means of a multicriteria analysis template described in the preceding section.

3.1 C-KIBS logic (producers' organizations)

The sanitary quality of potato seeds is a competitive advantage for the French industry. Producers' organizations (PO) have therefore been set up to better meet this objective, with the State's support. They are funded by the seed potato farmers' annual membership fees. The profitability of this collective investment of farmers in a service activity depends on the advisory services' contribution to the production of healthy and certifiable potato seeds. The advisors' aim is to identify the members' problems and to provide them with solutions to guarantee their plants' good health, from sowing to storage. Their strategy is essentially based on the relational and innovation dimensions.

- The relational dimension is crucial. The number of producers per advisor is low (18 in the case of PO1), and the frequency of advisor-farmer interactions is high (see Table 3). There is therefore a real personalization of advisory services, as opposed to a striving for productivity in the technical dimension. This strategy is thus somehow similar to the one of consultancy cabinets described by Labarthe et al. (2013), characterized by the importance of the face-to-face relationship between advisor and producer (front office) for the co-production of advice. In the case of C-KIBS, the membership fee is however pooled into a collective investment whose aim is to develop any advisory activities (front- and back-office) that is relevant for the purpose of the association. Thus, the added value of the services is not conceived exclusively at the individual level of the interactions between farmers and advisers, as it might be the case for small consultancy cabinets. In the case of C-KIBS, the activity of the advisors is not assessed only by measuring the intensity of the direct relationship with the farmers. The advisors can also devote themselves to back-office activities, both types of activities are considered complementary as the direct interaction with the producer contributes to the back-office in so far as it enables the producers' problems to be identified better.

- The innovation dimension also occupies a central place in the POs' strategies. Their back-office activities are multiple: research and development, experimentation, science and regulations monitoring, training, production of technical advice, etc. The POs devote significant financial and human resources to this: they have specific teams dedicated to these activities and their back-office budget is large (€1.4m in the case of PO1). Experimentation is the POs' main investment, but its implementation depends on the size of each PO and their investment capacity. It is less developed in PO2 and PO3, where it is carried out mainly through partnerships with research institutes, than in PO1 which, in addition to partnerships, runs its own experimental projects. The research themes vary and cover more than the testing of new varieties' potential. They include sanitary aspects (treatment of crops, seeking new pest control methods, improvement of the potato varieties' resistance to pests, decontamination of water, etc.), agronomic aspects (fertilization, production techniques), economic aspects (irrigation management, improvement of crop yields, etc.) and regulatory aspects (new pesticides). The PO accumulate and renew their knowledge by involving themselves in formal and informal research networks, notably with public- or private-sector research institutes, and by way of a science and regulations watch based on subscriptions to scientific and trade magazines and journals. The advisors moreover participate in training, both in-house and organized by research institutes.

The POs' advisory services' performance logic is therefore centred on the relational and the innovation dimensions, via joint investments in front- and back-office activities. The back-office investments are orientated by the advisor-farmer relationship. These investments are at the heart of the solutions proposed to farmers.

3.2 E-KIBS Performance rationale (potato seeds companies)

The performance of advisory services proposed to farmers by potato seeds companies is driven by a standardization rationale. These firms' core business is to create new potato varieties and/or to commercialize the seeds of these varieties. The aim of their advisory services is to secure both the quantity and the (sanitary) quality of the production. Indeed the services' profitability depends directly on the quality of the plant production of the farmers for whom they cater. The strategy chosen by these firms is to reduce front-office expenditures and to invest in back-office in order to produce technical references. Their justification is therefore in technical rather than relational terms. Unlike the POs, the role of quantitative outputs is important in the assessment of the activity of the advisors. Both the content and the form of the services are standardized (standardized technical forms to fill in, software, decision aid, technical message service, standard service package, etc.). The standardization of front-office advisory services frees up time of advisors as well as financial resources, that can be used for back-office activities (science monitoring, R&D, creation of databases, training). Justification in terms of innovation is important for these actors because it enables them to produce technical references that reduce working time spent in the front-office. But it also plays a significant commercial role for these firms and includes profitability objectives of its own, which do not necessarily correspond to the expectations of the farmers receiving the services: the back-office activities are centred on testing the potential of new varieties and on characterizing modes of production of these varieties. This enables these firms to broaden the range of varieties they can offer and to conquer new markets and new areas of application (crisps, chips, etc.).

The case of the pesticide firm is different. Rather than offering advisory services directly to farmers, it caters for PO technicians who act as intermediaries between the firm and many farmers, especially by organizing training sessions for farmers. The back office is oriented towards testing the effectiveness of pesticides in order to produce and disseminate knowledge to maximize the sale of pesticides. This approach corresponds to a rationale of standardization, through the formatting of knowledge on the effectiveness of pesticides.

This standardization rationale lies at the interface between justification in terms of technical aspects and in terms of innovation. It is based on significant back-office investments but on reduced front-office expenditures. The performance of the advisory services depends on these firms' ability to standardize their offer by producing technical references enabling them to reduce their front-office expenses.

3.3 The T-KIBS' Performance rationale (consultancy firms)

The T-KIBS are independent consultancy firms whose aim is to develop and sell advice to farmers, based on new technologies. Their services may be in the form of software, a decision aid tool, a recommended technique, etc.

Their profitability depends on guaranteed and increasing income from the sale of technical solutions to farmers. To ensure this profitability, T-KIBS grant more importance to back-office activities, where they invest in the acquisition of new technical references enabling them to broaden their network of service sales. To this end, they develop experimental activities, science and regulations monitoring, the creation of databases, development of software, etc. The back-office themes vary: testing of pesticide treatment programmes, of fertilization programmes, of soil-related techniques... This enables them to broaden their service offer. In the case of CC1, farmers have internet access to technical and regulatory databases. They also receive a technical manual distributed by the advisors at the beginning of the campaign. The CC2 develops decision aid tools (DAT) for managing fertilization and irrigation, software, etc.

Investment in knowledge production is very important for these consultancy firms, but the cost is high. This impacts on the technical and relational dimensions, as the former is given priority over the latter. Technical results are considered very important (125 farmers per advisor in the case of CC1). The direct face-to-face advisor-farmer

relationship is not central: advice is either collective or delivered remotely via information technology tools. This makes it possible to reduce front-office expenses and to save time and resources, which can then be invested in back-office.

The T-KIBS performance logic is based on the innovation and technical dimensions. It is driven by the back office to create new references and to sell solutions to farmers.

3.4 The P-KIBS performance logic (chambers of agriculture)

The chambers of agriculture are para-statal organizations which cooperate with the public authorities in promoting agricultural development. They assist farmers in several respects: technical, economic, regulatory, etc.

The advisory service performance rationale of chambers of agriculture is based on the innovation and technical dimensions. Due to compromises between the chambers of agriculture and the state, justification is situated mainly at the innovation dimension. The back office is therefore important in chambers of agriculture. In collaboration with state agencies, they fund activities (experimentation, science monitoring, training, etc.) on several research themes (research to find new pest and disease control techniques; development and monitoring of decision tools, e.g. plant health report; training). This research is undertaken under national or local programmes in partnership with public institutions (Ministry of Agriculture, INRA, Regional Council, etc.). Their purpose is to produce agronomic knowledge.

These investments are at the core of the chambers of agriculture's activity. Over the past few years there was a tendency to reduce public funding of advisory services. This has had repercussions on their front-offices activities that included free advice for farmers. The chambers of agriculture have sought to develop other sources of funding along with a commercial range of increasingly standardized services (standard packages in the case of CA1). These services are now delivered for a fee and are based on collective advice via Internet messaging, rather than on direct interaction with farmers. This enables the chambers of agriculture to reduce their expenses and thus to carry on investing in their back-office activities.

The P-KIBS' performance rationale is at the interface between the innovation and the technical dimensions. The back office is very important for the actors for these dimensions and is at the heart of their activities and their commitments to the State. At the same time, this principle enables them to meet national and regional objectives, and to inform the front-office activity. The standardization of front-office advisory services to finance the back office not only shows the importance of knowledge-production for these organizations, it also reflects the situation of public cost containment in agricultural advisory services in France.

3.5 The diversity of performance rationales

Although they have points in common, the advisory services' performance rationales differ considerably, depending on the type of actor, especially in terms of back-office investment choices. The C-KIBS orientate their investments towards knowledge-acquisition to ensure that competitive advantages are sustained nationally (in the French seed potato industry) and to guarantee the quality of both the potato seeds and the soil. On the other hand, E-KIBS' back-office investment choices are determined above all by the objective of moving into new markets, including internationally, by creating new varieties for which there is a demand. For the T-KIBS, the performance rationale is designed in order to produce new solutions and to increase the number of clients. In the case of P-KIBS, it is the compromise with the State that guides back-office investment choices and orientates them towards investments in research projects to achieve national or regional objectives.

These actors are embedded into power relationship. They have different positions in the supply chain. The traditional service providers (the T-KIBS and the P-KIBS) are being marginalized to some extent by the E-KIBS and the C-KIBS, which are moving into a dominant position. The latter have specific strategies related to the organization of the industry. The POs assist farmers to guarantee the quality of French production by identifying farmers' problems and providing them with solutions, while the E-KIBS assist producers to monitor and ensure the quantities and the sanitary and commercial quality of their production. These strategies impact on the way in which societal issues are integrated into the advisory services' back office.

4 Rationale of performances and societal issues

The reduction of pesticide use is taken into account in different ways depending on the performance strategies of the different KIBS. Issues relating to pesticide residues in food, the air, the soil and water may be integrated to a certain degree into back-office objectives. It is nevertheless possible to refine the analysis and to show the effect of performance rationales in the integration of societal issues into back-office configurations. For this, we based our study on the analysis of the innovation dimension. We thus cross-compared the different actors' performance strategies with the societal issues relating to pesticide reduction (Table 5).

The results are homogeneous for the C-KIBS. All of them integrate pesticide reduction issues into their back-office investments. Environmental issues are included in the objectives of their internal research projects and their projects with outside partners. They do research on new disease control techniques, on the creation of new varieties that are resistant to diseases, etc. When it comes to economic and regulatory issues, these actors test new pesticides in partnership with the pharmaceutical firms producing them. The integration of all issues into their back-office strategies

is justified by their relations with plant producers and with the entire industry, as guarantors of the sanitary quality of both the soil and the seeds. As these KIBS are financed by producers, they are not compelled to show profits or to have any objectives other than devoting their resources to R&D and seeking solutions to the producers' problems. The volume of these investments depends only on the size of the organizations.

In the E-KIBS, the potato seeds companies do not integrate societal pesticide-reduction issues into their strategies. Instead, they prioritize commercial objectives. They invest in the creation and testing of the potential of new varieties, to meet the different needs of various segments of the market.

The situation is completely different in the case of the pesticide producer, which invests to meet the different challenges regarding not only the environment but also users' health. The firm puts forwards its investments in research to develop new products (for instance replacing powders by liquid products) which are less dangerous for human health. These investments are fully integrated into its commercial strategy and serve as sales arguments to counter criticism and controversy over pesticide use.

The T-KIBS invest very little to develop services integrating the issue of the reduction of pesticide use, as they do not foresee a potential for the commercial development of such services. Moreover, investments in back-office are very costly for such firms, considering their small size. Thus, as pesticide reduction is not a priority for them and their client, they rather dedicate their resources to issues more directly related to the profitability of their clients.

P-KIBS prioritize investments in the production of agronomic references that meet the societal goals of reduced pesticide use. These investments are part of the compromises between the chambers of agriculture and the State. They are made in the framework of national or local research projects in partnership with institutions in both the public sector (the Ministry of Agriculture, the public research institutes, etc.) and the private sector. The P-KIBS benefit from the support of public funds for these investments. However, as this support is decreasing, they are increasingly orienting their investments towards the acquisition of references enabling them to create and sell standardized services to farmers.

We thus find that the more the performance rationale is controlled by the clients, the more the R&D will be oriented towards the acquisition of agronomic references that integrate environmental goals of pesticide reduction into the organization's investments (the case of the C-KIBS). One might imagine that the C-KIBS would develop specific actions to better guarantee producers' health, notably by seeking to reduce risks of exposure to toxic products during their application on the crops. Yet that is not the case at all. This may be because, in Europe, the organizations providing agricultural advisory services give very little thought to preventing chemical risks (Laurent 2014).

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Tables and figures

Table 1. Proposed classification of services, to enrich the taxonomy proposed by Miles (1995).

Type of KIBS	Activity (share of advice in the activity)	Organization's objective	Status	Relations with clients (the role of advisory services in these relationships)
Professional KIBS (P-KIBS) (Miles 1995)	Service = 100% of the activity	Making profits via the commercialization of services	Private firm	<ul style="list-style-type: none"> - Contractual relationship - Service provision at the heart of the relationship (what is sold is above all the advisors' working time) - Advisors' core competencies
Technological KIBS (T-KIBS) (Miles 1995)	Service = 100% of the activity	Making profits via the commercialization of services	Private firm	<ul style="list-style-type: none"> - Commercial relationship revolving around the sale of an intangible good (software, tool to help decision making, map, etc.) - Service and advice accompany this sale - Revolves around R&D (ICT, etc.)
Embedded or Integrated KIBS (E-KIBS or I-KIBS) (Barcey Bonamy 1999, Djellal and Gallouj 2010)	The services are above all developed to accompany a commercial activity concerning a good (input or output)	Improving the commercial activity on goods (quantity, quality) by providing clients/suppliers with these goods and related services. Note: a tendency is developing to seek profits on the service activity itself	Private firm or cooperative	<ul style="list-style-type: none"> - Commercial relationship (contract on the sale of products or on the collection of the farmer's produce) - The services accompany this commercial relationship (notably to guarantee the quality and quantity of the goods) - There is a tendency to separate the offer of these services from transactions on goods
Client owned KIBS (C-KIBS)	Services = 100% of the activity	Improving the performance of the clients/owners of the organization	Association (or firm whose capital is owned by farmers)	<ul style="list-style-type: none"> - The beneficiary of the services is a member of the association (and pays a membership fee) - This fee is a pooled investment in advisory services (front and back office) - Additional services can be invoiced individually

Table 2. Analysis framework for advisory service performance.

Dimensions	Indicators
Financial	*Profitability of the advisory service
Technical	*Productivity of the advisory service: -Ratio farmers/advisor -Surface areas under crops/advisor -Quantity of seed potatoes sold/advisor *Level of standardization -Is there a standardization of advisory services? *Rate of dysfunctions -Are there indicators of the advisory services' success?
Relational	*Personalization -Frequency of visits -Duration of visits *Client loyalty -Turnover of producers -Turnover of advisors *Nature of the contract
Innovation	*Share of the total budget devoted to the back office *Number of back-office staff *Back-office activities -Experiments -Databases -Scientific monitoring -Training
Civic	*Taking into account controversies over the use of pesticides -Health -Equity

Table 3. General presentation of the organizations interviewed.

Organizations interviewed		Turnover	Total staff	Number of advisors	Number of clients	Activities	Status	Financing	Type of KIBS
Producers' Organization (PO)	OP1	€14 M	63	24	450	<ul style="list-style-type: none"> - Agricultural advice - Control and certification - Research and experimentation - Plant breeding 	Association	<ul style="list-style-type: none"> - Annual membership fees paid by producers - Projects 	C-KIBS
	OP2	€1 M	39	18	285				
	OP3	€1 M	15	2	120				
Potato seed company (CP)	CE1	€10 M	70	8	175	<ul style="list-style-type: none"> - Agricultural advice - Production, collection and dispatching of seed potatoes 	Private	<ul style="list-style-type: none"> - Sale of seed potatoes - Royalties 	E-KIBS
	CE2	€10 M	21	3	150				
	CE3	€10 M	35	5	160				
	CE4	Ø ¹¹⁶	2	1	20				
	CE5	€6 M	7	1.5	60				
Pesticide firm (CP)	FP	€342 M	350	100	-	<ul style="list-style-type: none"> - Production and commercialization of products to protect plants and seeds, plant breeding, etc. - Training advisors - Agricultural advice 	Private	<ul style="list-style-type: none"> - Sale of pesticides and seeds 	E-KIBS
Chambers of agriculture (CA)	CA1	NP ¹¹⁷	80	Ø	Ø	<ul style="list-style-type: none"> - Agricultural advice - R&D - Training 	Para-public	<ul style="list-style-type: none"> - Public funds; land tax on unbuilt land - Public funding of research projects - Sale of services 	P-KIBS
	CA2	NP	30	Ø	Ø	<ul style="list-style-type: none"> - Training advisors - Coordination of the various activities of the "<i>chambres départementales</i>" - R&D 			
Consultancy firm (CC)	CC1	€0.2 M	2	2	250	Agricultural advice	Private	Sale of advisory services	T-KIBS
	CC2	€1.15 M	16 ¹¹⁸	12	4000				

¹¹⁶ Missing datum

¹¹⁷ Irrelevant datum

¹¹⁸ CC2 works under contract with independent advisors

Table 4. Template to analyse the advisory services' performance of producer organizations (OPI).

Dimension	Indicators for OPI
Financier	The profitability of the advisory service is related to the quality and quantity of the certified seed potatoes produced
Technical	<ul style="list-style-type: none"> *Productivity of the advisory service → 18 farmers per advisor or 471 ha per advisor or 14,700 tons per advisor *Level of Standardization → Non-standardized contract *Rate of dysfunctioning → Annual evaluation of advisors based on seed potato quality
Relational	<ul style="list-style-type: none"> *Personalisation → Frequency of visits: -Duration of visits *Client loyalty → Turnover of producers -Turnover of advisors *Nature of the contract Visits are personalized in relation to the size of the far and its needs. Quantitative and qualitative personalization. -Important in terms of inputs. This is due to the development of the OP. -Weak Formal Gnis contract
Innovation	<ul style="list-style-type: none"> *Share of total budget devoted to the back office → 5% of the turnover devoted to back office activities *Number of staff in the back office → 28% of total staff devoted to back office *Back-office activities - Creation of a research and development firm - Setting up and participating in research projects on various themes (control methods, creation of varieties, decontamination) - Experimentation (testing new techniques, testing pesticides, testing new varieties), science and technology watch, training - Funding of PhDs - A network of public, local and international partners (INRA, CNRS, Potato Research Center, Agriculture and Agri-Food Canada, etc.), and private partners (SYNGENTA, McAIN, BAYER, etc.)
Civic	<ul style="list-style-type: none"> Taking into account controversies over the use of pesticides Equity between clients - Health controversies are taken into account: integration of the pesticide issues into research topics, training of advisors in Certiphyto.

Table 5. Template to analyse the advisory services' performance of collectors-dispatchers (CE 3).

Dimension	Indicators for CE3
Financial	Profitability of the advisory service is derived from part of the sale of seed potatoes
Technical	<ul style="list-style-type: none"> * Productivity of the advisory service → 32 farmers/advisor or 600 ha/advisor or 15,000 tons/advisor * Level of standardization → Standard contract and visits focused on the monitoring of the seed potatoes quality Collective meetings with a common message * Rate of dysfunctioning → Annual evaluation of the advisors based on seed potatoes quality
Relational	<ul style="list-style-type: none"> * Personalisation → Frequency of visits; 4 individual visits and 2 collective meetings * Client loyalty → Producers' turnover very low; Advisors' turnover very low * Nature of the contract → Formel Gnis contract
Innovation	<ul style="list-style-type: none"> * Expenditures -25% of the advisors' time; €200,000 annually on experiments * Back-office activities -Experimentation / Two sets of experiments: <ul style="list-style-type: none"> -Test fields in three regions in France to test the potential of hybrids received from the parent firm; positioning of the variety in a particular market, in a geographical area, and for a type of use. - Test fields for plants to determine the most appropriate cropping itinerary for each variety, to improve the plant's sanitary and commercial quality * Databases: two internal databases - Parent firm: on the profits of varieties and on the cropping techniques -subsidiary: technical data sheets per variety Subscriptions to magazines * Science watch Formal interaction, technical meetings, North committee Informal interaction No participation in the research projects *Training The advisors participate in Arvalis meetings
Civic	<ul style="list-style-type: none"> Controversies over pesticide use are not taken into account The question of equity between clients is not taken into account

Table 6. Back office of the KIBS and societal implications.

Type of KIBS	Organization	Sanitary implications		Environmental implications			Economic implications		Regulatory implications
		Users' health	Pesticide residues	Water quality	Air pollution	Soil pollution	Product efficacy	Cost/Yields	Anticipation of prohibition
C-KIBS	Producer organizations (OP)	OP1	O	N	O	O	O	O	O
			Certiphyto Training (1)		Decontamination	Seeking alternative methods: mineral and plant oils; hardy plant varieties, etc.	Tests on new phyto-pharmaceutical products		
		OP2	O	N	N	O	O	N	N
			Certiphyto Training			Seeking alternative methods: mechanical weeding and haulm stripping; new varieties, etc.	Product tests		
		OP3	O	N	N	O	O	N	N
E-KIBS	Potato Seed companies		Certiphyto Training			Seeking alternative methods: trapping of insects, cropping techniques, new varieties, etc.			
		CE1	O	O	N	N	N	N	N
		CE2	Certiphyto, choice of less dangerous products, certification of advice						
		CE3	O	N	N	N	N	N	N
			Certiphyto						
		CE4	O	N	N	N	N	N	N
			Certiphyto						
P-KIBS	Chambers of agriculture	CA1	O	N	O	O	O	NC	NC
			Certiphyto		Ecophyto Project				Product tests
		CA2	O	O	O	O	O	O	O
			Ecophyto Project						
E-KIBS	Phyto-sanitary	FP	O	O	O	O	O	O	O
			Replacing powders by liquid products to protect users' and environmental health				Tests of efficacy of the products (yields)		Research on new products
T-KIBS	Consultancy firm	CC1	N	N	N	N	N	O	O
					Tests on treatment programmes with reduced doses				Tests with new products
		CC2	N	N	N	N	N	N	N

(1) Certiphyto is a compulsory training course for people who sell and use pesticides <http://agriculture.gouv.fr/Certiphyto-un-certificat-pour,16486>

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Value (co)creation in emerging KIBS industries: Absorptive capacity matters. Evidence from Russia

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The paper focuses on knowledge-intensive business services (KIBS) to study the determinants of the successful value creation. We argue that value creation is not always efficient: the value of services could be lost due to an inefficient absorptive capacity of service consumers, who must be value adders together with providers due to the nature of services. The origins of inefficiency are elucidated by a thorough study of the interaction between KIBS producers and consumers (co-production). The methodology includes the study of observable patterns in Russian KIBS sector performance in 2007-13 obtained from specialised surveys of Russian executives who were asked to answer questions both on their own company and on market developments. We provide both cross-section and generalised analysis of survey data.

Introduction

The notion of absorptive capacity was initially introduced in macroeconomic dimension and characterized the ability of a national economy to absorb and exploit external resources, information, and knowledge (Adler 1965). In their classic paper Cohen and Levinthal (1990, p.128) redefined the concept on microeconomic level by labeling absorptive capacity as “the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends”. It is generally considered an imperative for business success.

From their thorough review of literature on the fundamentals of absorptive capacity concept, Roberts et al. (2012) reconstruct major assumptions of a firm’s ability to recognize and to utilize external knowledge. Among them two are of vital importance for our study:

First, absorptive capacity depends on prior related knowledge. Without some prior related knowledge, a firm will not be able to accurately determine the potential value of external knowledge.

Second, absorptive capacity is path-dependent. Accumulating absorptive capacity in one period will permit its more efficient accumulation in the next. Likewise, in an uncertain environment, absorptive capacity affects expectation formation, permitting the firm to predict more accurately the nature and commercial potential of technological advances. These two features of absorptive capacity—cumulativeness and its effect on expectation formation—imply that its development is path dependent.

The exact configuration of absorptive capacity, though generally accepted, differs in details. Bibliometric study of Lane et al. (2006) present absorptive capacity is a multidimensional construct that consists of three interrelated competences: knowledge identification, knowledge assimilation/transformation, and knowledge application. Zahra and George (2002) emphasize four dimensions: acquisition, assimilation, transformation and exploitation of knowledge. In our paper we shall use three-dimensional approach suggested by Lane et al. because we consider it closer to the original Cohen and Levinthal’s definition and includes the recognition stage, which is important for our purposes.

Scholars have leveraged Cohen and Levinthal’s original work on absorptive capacity in several ways. The application of absorptive capacity in such areas as innovation, interorganizational learning, mergers and acquisitions, and new product development signifies its substantial contribution to competitive advantage and firm performance (Lane et al. 2006). Meanwhile along these variety of research field we made two important observations.

First, the search of valuable external knowledge often appears as the specially organized process of monitoring of a firm’s environment. E.g. Cohen and Levinthal (1989) and Lichtenthaler and Lichtenthaler (2009) show that a firm develops collective knowledge about certain areas of markets, science, and technology through its research and development activities, and screen those areas for the sake of improving its products and services.

Second, among all components of absorptive capacity, most authors put the main emphasis on the final stage. Intensive studies are devoted to a variety of applications of the newly absorbed knowledge; e.g. replenishment of a firm’s knowledge base (Van den Bosch et al. 1999), forecasts of technological trends (Cohen and Levinthal 1994), reconfiguration of existing capabilities (Pavlou and El Sawy 2006), and creation of innovative products and services (Tavani et al., 2013). Neglected are the first stages of recognition and acquisition of new knowledge.

Empirical studies support these deductions from theoretic literature. Measuring of absorptive capacity involve self-explanatory proxies. E.g. Cohen and Levinthal (1989) tested the general predictions of their model using business unit data for 1975 through 1977 from the FTC’s Line of Business Program, and used R&D sales as a proxy for absorptive capacity, though they obviously measure the final outcome of absorption.

Zahra and George (2002) suggested a series of indicators for all elements of absorptive capacity:

- Knowledge acquisition capability (the number of years of experience of the R&D department, the amount of R&D investment)
- Assimilation capability (the number of cross-firm patent citations, the number of citations made in a firm's publications to research developed in other firms)
- Transformation capability (the number of new product ideas, the number of new research projects initiated)
- Exploitation capability (the number of patent, the number of new product announcements, the length of product development cycle)

The first two sets of proxies picture the corresponding stages of knowledge absorption as the process of external monitoring.

The purpose of our study is to present a slightly different view on absorptive capacity. First, we study the sources of external knowledge that appear in core business activities of a firm through interaction with its suppliers. This approach is in line with an augmenting tradition within the studies of new product development. E.g. Rindova and Fombrun (1999) emphasize that a knowledge exchange process during product development process demands strong customer learning capabilities. Tsai (2009) also proves that high levels of absorptive capacity would allow a customer firm to incorporate fruitful knowledge and capabilities of suppliers. The empirical study of Tavani et al. (2013) introduces customer's ability to learn from their suppliers among other proxies of absorptive capacity. These studies bring up the problem of absorptive capacity for new knowledge transfers within everyday businesses rather than for knowledge obtained through special monitoring efforts.

Second, we intend to put special emphasis on the beginning stages of knowledge absorption because they are crucial for the entire process. The literature review above shows that these stages are little explored in general. Few relevant studies associate recognizing of new knowledge with screening of open external sources like patent bases and conference outcomes. Again, the recognition of value of the new knowledge arriving from everyday interaction between suppliers and customers is practically out of view.

We study the problems of "everyday" absorptive capacities by the example of firms who use knowledge-intensive business services (KIBS). This paper is aimed to examine the ability of Russian companies to appreciate and to apply external novelties they face when obtain KIBS. KIBS are widely known as users, carriers and sources of innovation (Miles et al 1995). The KIBS sector appears as a set of activities aimed to help other companies to solve problems than need external sources of knowledge. In particular, the existing literature stresses that (a) provision of KIBS links the knowledge of the consumer with the knowledge that exists elsewhere, thus improving the exchange, availability and usability of the knowledge, and (b) each KIBS provides a solution to a specific problem of the customer and thus embeds and transfers knowledge that would be otherwise unavailable to or neglected by the customer. (Thus, for example, Muller & Zenker, 2001, p.1504, subdivide knowledge processing within KIBS firms into the integration of external knowledge, acquisition of available problem specific knowledge, and elaboration of the new problem specific knowledge; see Landry et al., 2010, for a discussion of these and other characteristics of KIBS).

Therefore KIBS are information services by nature. Sometimes their rendering is accompanied by producing of a material object, but even in this case the value of informational constituent exceeds the one of subjoined artefact essentially. The use of KIBS hence means the use of external non-profile knowledge, and the problem of absorptive capacity faces the user in its entire complexity.

Data and Methodology

The data used here derive from specialised surveys that have been undertaken in Russia, covering 600-800 producers of KIBS annually for each year across 2007-13.¹¹⁹ The core of the surveys was replicated across this period, but some questions were only asked in particular years, so our reporting below will use data from various years according to availability. The sample consists of Russian-based producers of KIBS¹²⁰ selected annually based on their reported turnover. Companies were invited to take part in the survey consecutively. If the invitation was rejected, the next invitation (to a company with the next highest turnover) was sent out. Occasional severe delays with replies or replies from firms that earlier rejected the invitation resulted in minor deviations from 60 firms per sector, which does not affect the total sample quality. Executives of these firms answered questions on their own company and on the general market developments. All surveys are anonymous, some firms may be included in several surveys (not

¹¹⁹ The surveys are designed by the Institute of Statistical Studies and Economics of Knowledge (ISSEK) and are conducted by ROMIR Monitoring using original topic guides and questionnaires developed specially for this research.

¹²⁰ KIBS production in Russia is strongly concentrated, with 20 per cent of the companies accounting for around 80 per cent of the market. Respondents in each segment were recruited from the top 200 companies in each sector (as measured by their turnover). While some of the same companies will feature in more than one year, this was not designed as a panel survey. Since data are provided to us anonymously, we cannot exclude such multiple representation. However, ROMIR, the survey firm, has indicated to us that in each year around 15–20% of companies have participated in earlier surveys, though our respondents do not participate in the survey more than once every two years. Foreign-owned companies are excluded from the study, since the large multinationals who do supply Russian markets are believed to provide highly standardized services – as was confirmed by our expert interviewees. Russian companies compete with these multinational firms, in part, through providing more customized services; they would generally fail to compete on the basis of economies of scale.

necessarily successive), but it does not alter the generalised results. We cannot prevent one and the same firm from taking part in several consecutive surveys, therefore this dynamic double-counting, or potentially misbalanced panel, has no effect for any particular year reported.

The KIBS sectors covered in the surveys are advertising, marketing, audit, IT-services, recruitment, engineering, financial advice, legal advice, property development services, and business design. This choice includes most of the industries described as KIBS in the existing literature. While there is some disagreement as to the precise statistical identification of KIBS sectors (see e.g. Hipp, 1999; Koch and Stahlecker, 2006; Muller and Doloreux, 2007), it has been common to include most of the industries covered in NACE (Revision 1) divisions 72–74.¹²¹ Our sample contains a good range of these industries, including both long-established professional services and newer technology-related and management services. The samples for all of these sectors were dominated by relatively small firms – 60% of more of the cases in each sector in 2011, for example, had 50 or fewer employees. It is common in other countries, too, for service firms, and KIBS, to be relatively small in scale (CRIC/IDSE/ISE, 2001).

While we cannot match specific users and suppliers, we have also opportunities to draw on data about KIBS users. In 2007 and in 2011, a survey parallel to that of KIBS suppliers covered over 700 business consumers of one or more of the KIBS services discussed above. Each of the business consumers were asked about their experiences with each of the types of KIBS used by the company. In 2007 the average client company used 4.7 services, and in 2011 4.2 services, so we have about 3300 observations by customers about their experiences.

Later we present results from these surveys, addressing the hypotheses set out above, and providing other relevant information concerning innovations in KIBS. But first, we need to discuss the role of KIBS in Russia, and consider how one aspect of this context affects our research strategy.

Main findings

This paper aims primarily to fill in the gap both in theoretical and empirical literature by examining thoroughly the first component of the absorptive capacity, i.e. the ability of KIBS customers to recognize the value of new knowledge which is embodied in KIBS due to their knowledge intensity.

Two patterns of consumer value creation are commonly observed: standardisation and customisation of products. An important value-creating feature of standard products is reduction of consumer costs, both direct (prices of standard products are lower) and indirect (costs of recognising, selecting and learning-to-use). Personalised production, on the contrary, is costly, but the decrease in value due to a complexity of choice and use is compensated by an additional value from the perfect fitting to THE consumer needs. Service industry provides a good example of both standardisation and personalisation with a wide range of intermediate solutions.

Many studies confirm that KIBS are more prone than most other sectors - including most other service industries - to produce customized services. Hipp et al (2000) and Tether et al. (2001) prove it using German survey data, Sundbo (2002) – using Danish ones, Evagelista and Savona (1998) – Italian, Hortelano and González-Moreno – Spanish, Nahlinder (2005) – Swedish.

Our surveys show that Russian KIBS sector also provides an excellent empirical support to the hypothesis about wide spectrum of variously customized decisions. Following the above-mentioned European empirical approaches, we asked KIBS providers to divide the total amount of their services into three groups: standard (replicable with minor replication costs), customized (highly bespoke, hardly replicable) and intermediate group having “standard shell with individualised nucleus” (partially customised), Table 1 shows that in all sub-sectors these three groups are well filled.

Table 1. Distribution of KIBS in terms of degree of standardisation, 2010.

Responses to the question: "What share of your services in 2010 falls into each of these categories?" (mean shares shown; standard deviations in brackets)

	Overall	Sectors									
		AD	MKT	ADT	IT	REC	ENG	FIN	LEG	DVP	DSGN
Standard	36.1	30.5	42.0	45.2	43.8	38.7	34.8	34.5	32.9	33.5	25.4
	(32.6)	(30.9)	(32.5)	(32.9)	(28.6)	(30.2)	(38.5)	(31.2)	(35.5)	(35.5)	(26.1)
Standard “nucleus” with personalised “shell”	39.2	43.6	43.5	33.4	39.0	44.4	30.6	51.0	28.5	41.9	36.2
	(31.1)	(31.6)	(31.2)	(29.0)	(26.0)	(26.8)	(32.5)	(33.6)	(30.9)	(36.0)	(28.0)

¹²¹ To be precise, the NACE codings for the sectors studied here are 72.1-72.4 (hardware, software and database consultancy, supply and processing – grouped as IT-services), 73.1 (for engineering), 74.1 (for legal advice, audit and marketing), 74.2 (building, machinery and industrial plan design), 74.4 (advertising), and 74.5 (labour recruitment). The study also included two sectors that are not usually considered KIBS - NACE divisions 70.1 and 70.3 (property development and real estate intermediation) and 65.2 (financial intermediation) with 67.1 (activities auxiliary to financial intermediation). The latter two are often provided jointly by the same entity and it is hard to separate them. With regard to these we specifically focus on companies that provide financial intermediation and associated services to business customers.

	Overall	Sectors									
		AD	MKT	ADT	IT	REC	ENG	FIN	LEG	DVP	DSGN
Customised	24.5	25.3	14.4	22.5	17.6	18.2	35.0	14.6	38.2	21.6	38.2
	(29.6)	(28.1)	(19.5)	(27.6)	(18.0)	(19.7)	(39.0)	(23.6)	(39.1)	(27.8)	(33.1)

Here and further AD = Advertising; MKT = Marketing services; ADT = Audit; IT = Information technology services; REC = Recruitment services; ENG = Engineering services; FIN = Financial advice services; LEG = Legal advice services; DVP = Property development services; DSGN = Business design
Source: ISSEK-ROMIR survey, 2010.

Meanwhile customers do not recognize perfectly the degree of service customization (see Table 2, where we use more fractional scale of customization for more precise estimations). They tend to treat a visible part of customized services as standard ones. These customers do not understand the value of efforts that were made by providers to tune the service to individual needs, and thus do not recognize the value of the resulting customization.

Table 2. Standardisation of Services in Russia as seen by service providers and consumers, 2007.

Responses to the question: "What was the share of standard services in the total volume of services provided/ordered by your company?" (standard deviations shown in brackets). Consumers could answer questions for multiple KIBS sectors resulting in the high number of total responses, *N*, in the final row)

		Overall	Sectors									
			AD	MKT	ADT	IT	REC	ENG	FIN	LEG	DVP	DSGN
Providers	Share	47.0	45.8	36.5	60.4	59.7	40.5	47.0	59.2	50.1	48.4	23.5
		(32.2)	(28.6)	(29.2)	(28.4)	(29.0)	(34.9)	(27.6)	(29.9)	(32.9)	(33.4)	(29.8)
	<i>N</i>	612	68	59	62	63	53	60	63	53	63	68
Consumers	Share	54.6	52.8	54.8	59.6	59.3	56.1	52.8	61.1	52.5	53.1	46.6
		(23.0)	(22.8)	(22.2)	(22.0)	(22.5)	(23.6)	(21.2)	(23.5)	(25.8)	(21.7)	(21.8)
	<i>N</i>	2422	515	187	256	283	236	196	139	210	164	236

Note that *N* means different things for providers (it is here the number of firms, which equals the number of answers), and for customers (it is the number of valid answers, which exceeds the number of firms).

Source: ISSEK-ROMIR surveys, 2007.

Consumed KIBS are considered to be on average less tailored than produced ones; sometimes the difference is substantial (up to two times). We named this observable fact *perception asymmetry*. It differs from widely known information asymmetry because a customer may be fully informed about the rendered service, but consider it as equivalent to services provided to other consumers. Then the customer believes to purchase a standard service though actually the service was tailored.

In other words perception asymmetry means that a producer understands what differs his service from services provided by other producers, but a consumer may not recognise the difference. Producers know the technology of service production objectively, but consumers subjectively compare the provided service with similar ones ("services of the same name") supplied to other consumers. This effect cannot be explained by asymmetric information (see e.g. Gallouj (1997), for asymmetric information in services), because it does not depend on how well the customer is informed about the service itself. In a standard asymmetric information setting (Akerlof, 1972) knowledge of the quality of products delivered to other customers is irrelevant. The problem of asymmetric perception only arises in an economy with highly heterogeneous products, which is the case with KIBS. In particular this can lead to a distorted pricing in a market where consumers expect prices for seemingly homogeneous products to be levelled, whereas providers of highly heterogeneous services would seek for a pricing mechanism suitable for unique products targeted at individual customers.

Due to perception asymmetry producers know their services are tailored, but consumers consider them standard. We discovered this phenomenon and labelled it the "*turbid glass*" effect. When one looks through a turbid glass, similar though different objects may seem identical. Likewise KIBS customers see the vague picture of rendered services where differentiation and individuality are indistinguishable.

The "turbid glass" effect prevents customers to distinguish between a tailored service and a standard one, i.e. they underestimate the bespoke characteristics of services and overestimate their standardized characteristics. In other words, we observe partial losses of value embodied in customization.

We do not mean that all KIBS customers look at the sector through the “turbid glass”, otherwise we observe zero demand for customized services, - in the absence of perceptible differences between the services, less expensive standard services crowd out more expensive customized ones. We only claim that KIBS users have different abilities to recognise the which is embodied in services by the technologies of their production. Some customers have better absorptive capacity since they recognise heterogeneity of services and treat them as customised solutions for their businesses. Other customers imagine services as commoditised and thus less prepared to assimilate their actual complexity.

Seeking for the origins of the “turbid glass”, we appeal to Cohen and Levinthal’s (1990) remark about path-dependence of absorptive capacity. They also highlighted the importance of accumulated expertise for proper absorption of non-profile knowledge. We explored perception asymmetries to test this hypothesis with reference to KIBS, which are always beyond customer’s principal activities. Even if a customer firm delegates service provision only partially, and the “make-or buy” trade-off is settled by combination of in-house production of services and purchasing it from an external supplier, service production remains a non-profile business for the customer. innovations beyond its principal activities. Their implication impels the firms to special efforts [Cohen and Levinthal, 1990, 150]: “When, however, a firm wishes to acquire and use knowledge that is unrelated to its ongoing activity, then the firm must dedicate effort exclusively to creating absorptive capacity (i.e., absorptive capacity is not a byproduct)”

KIBS customers should make especially serious efforts in their service appropriation activities when dealing with customised or partially customised KIBS production. Bespoke, particularised, KIBS require detailed information about the customer’s needs; generic knowledge about a representative consumer is not sufficient. Drawing on evidence from several surveys, Miles (2008) argues that innovative KIBS providers rely on the information obtained from their customers more heavily than do innovators among manufacturing firms and most other service businesses. The particularisation of a service normally requires that the client supplies, at a minimum, relevant information about the business processes problems that the KIBS firm is helping to address. Quite often, the client is engaged in prolonged dialogue with the KIBS firm concerning the nature of the problem and the applicability of possible solutions. (These may be discussed more abstractly, or actually prototyped or trialled in practice.) The roles of KIBS in knowledge transfer are widely recognised and studied in the literature (see e.g. Hipp, 1999, for an early review, and Strambach, 2008, for a more recent contribution), but there is little research on just how this knowledge is transferred¹²². One exception is Landry et al. (2010), studying the types of knowledge transferred from KIBS providers to customers, and examining the factors that facilitate such an exchange of knowledge. In the present study, we extend their findings in terms of the innovative impact of KIBS on their customers

A term often employed in the context of service relationships is “coproduction” – signifying the role of the customer in generation of the service product. Much of the literature on coproduction has concerned public services (Percy, 1983, Whitaker, 1980 are early examples); a smaller volume of studies bring the perspective to bear on consumer and business services (e.g. Marion, 1997, Spohrer & Maglio, 2008). The basic point is that the customers and users of services often have to contribute greater or lesser amounts of effort to the service production process. Sometimes physical presence is enough, but often the client is required to input information and to interact more intensively with the service provider (and sometimes with other clients).

In the KIBS case, as noted above, the client has, at the very least, to specify its business problem and provide relevant information to the provider. Often, higher levels of engagement are required. KIBS services products can be seen as having two producers. The service provider inputs mainly its intellectual labour resources. The customer firm inputs information about itself, and participates in a process of change (which may involve various stages, including, as suggested above, stages of testing solutions and obtaining feedback on them). Koch and Strotmann (2006) showed that the market success of KIBS firms crucially depends on the quality of coproduction. In other words, co-production is vitally important to create proper consumer value, especially in the case of highly bespoke services because Imperfect information hinders proper bespeaking. The better the service is tailored, the better it suits the customer’s need, and the easier should be its application. This is the reason why the quality of co-production appears as an essential determinant of absorptive capacity.

Surprisingly, co-production rarely appears in absorptive capacity studies independently, but rather in the general context of interaction between suppliers and customers. In this paper we discuss it as a separate topic because imperfect co-production may hinder the customers from proper absorption of services even under excellent potential absorptive capacity.

To study the level of coproduction, KIBS providers were asked to estimate the level of customers’ involvement in the service production on a scale ranging from 1 (minimum participation, no inputs provided except the terms of reference for the service contract) to 10 (maximum participation, joint project implementation). Table 3 presents data from the 2007 and 2011 surveys: the overall score for coproduction in KIBS, and that in most sectors exceeds 6 out of 10 in both periods, despite the recent economic downturn. (Furthermore, though not displayed here, some 30 per cent of KIBS firms report scores of 8-10, in both samples.)

¹²² We will use this common formulation, though resist the notion that knowledge is a “thing” that can be moved from one location to another. We would rather see knowledge as a property of knowing agents, and that acquisition of this property involves processes of assimilation of information and building this into cognitive frameworks.

Table 3. Coproduction of KIBS in Russia.

Responses to the question: "Please estimate the degree to which the customers are involved in the production of services, on the scale 1 to 10" (mean scores shown; standard deviations in brackets).

	Overall	Sectors									
		AD	MKT	ADT	IT	REC	ENG	FIN	LEG	DVP	DSGN
2007	6.1	5.2	6.1	5.6	6.4	5.7	6.2	7.0	5.6	6.3	6.5
	(0.24)	(0.24)	(0.21)	(0.18)	(0.24)	(0.31)	(0.24)	(0.17)	(0.25)	(0.27)	(0.26)
2011	6.3	5.9	6.0	7.3	6.2	6.2	6.2	6.5	6.0	6.4	6.2
	(0.24)	(0.22)	(0.23)	(0.26)	(0.26)	(0.22)	(0.21)	(0.25)	(0.26)	(0.26)	(0.24)

Source: ISSEK-ROMIR surveys.

The conclusion is that these KIBS firms do see their as often participating quite substantially in coproduction of their services. Overall, there is little change between periods. Individual sectors move in different directions, but generally to very limited extents, despite the economic downturn.¹²³ It may be that some firms are pushed towards more light-touch service provision, while others seek more coproduction, as a result of economic stringency. In both the 2007 and 2010 samples, F-tests on an analysis of variance of results indicate statistically significant differences (at the 99% confidence level) in the degree of customers' involvement in production of services across economic sectors. This evidence is provided by ANOVA test (differences are significant at level of 99% confidence interval).

Substantial score for coproduction does not nevertheless guarantee its quality. Bettencourt et al. (2002), who consider coproduction to be a defining characteristic of KIBS, accordingly point out that clients may not sufficiently recognize the necessity of coproduction. Our surveys also show that the degree of co-production, though high enough, is nevertheless substantially beyond providers' needs. Table 4 compares actual and desired levels of customer involvement, using the same 10-degree scale as Table 3.

Table 4. Actual vs desired levels of co-production.

Responses to the question: "Please estimate the degree to which the customers are actually involved/desired to be involved in the production of services, on the scale 1 to 10" (mean scores shown; standard deviations in brackets), 2013

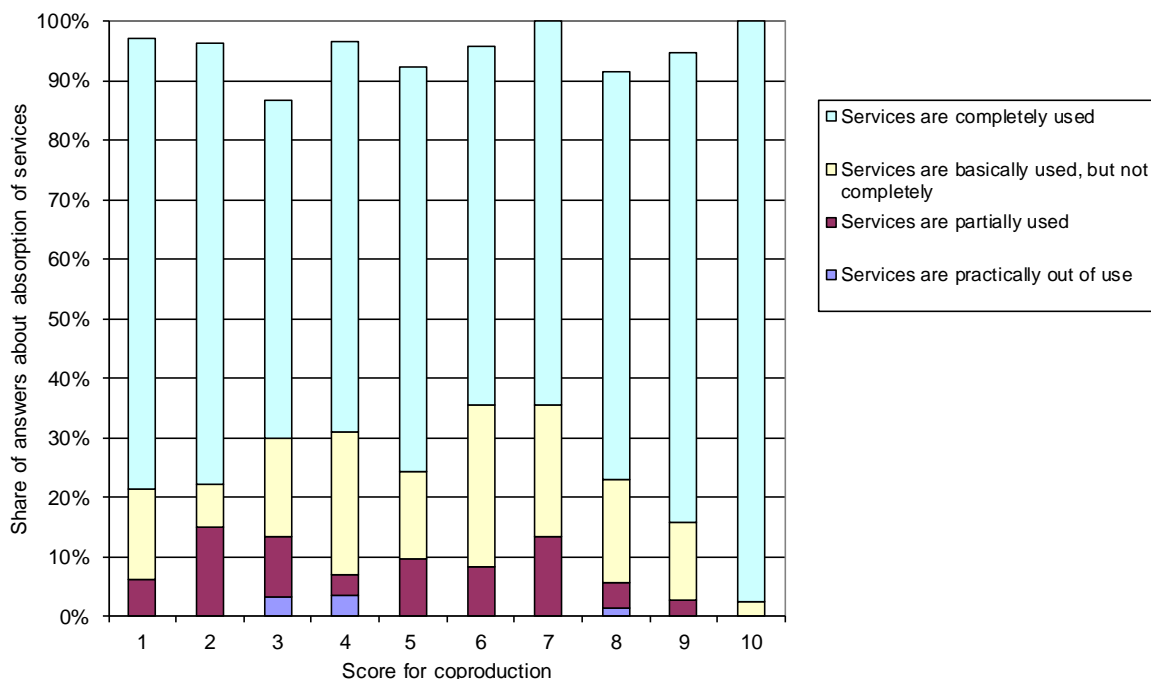
	Overall	Sectors									
		AD	MKT	ADT	IT	REC	ENG	FIN	LEG	DVP	DSGN
Actual	6.2	6.9	6.8	5.8	5.9	6.0	5.0	6.6	6.4	6.2	5.9
	(0.12)	(0.30)	(0.35)	(0.34)	(0.33)	(0.35)	(0.43)	(0.46)	(0.41)	(0.37)	(0.35)
Desired	7.6	7.8	8.0	8.1	7.0	8.3	6.7	7.7	7.4	7.8	7.0
	(0.12)	(0.29)	(0.35)	(0.31)	(0.34)	(0.29)	(0.39)	(0.52)	(0.43)	(0.46)	(0.36)

Source: ISSEK-ROMIR survey

Our survey asked about the quality of coproduction, and the factors that were involved when this was low. No wonder than in 2013 only half (50.7 per cent) of the Russian KIBS producers considered that they received excellent coproduction from their counterparts.

Insufficient coproduction inevitably leads to mismatch between a customer's needs and the final quality of service even if the contribution of provider was perfect. The potential customer value of service is therefore partially destroyed. The service becomes less appropriate and less useful for further stages of absorption (transformation and exploitation). Figure 1 supports this argumentation by emphasizing two important observations. First, Russian KIBS consumers failed to absorb KIBS in full amount; the share of respondents who reported full absorption (vertical axis) is beyond 100 per cent for all groups (cross-section analysis, though not shown on the chart, confirms incomplete absorption in all observed sectors). Second, the largest share of absorbed services corresponds the largest score for coproduction.

¹²³ We do not have panel data; it is possible, but unlikely, that there is more volatility at the firm level.



Source: ISSEK-ROMIR survey

Responses to the question: "Please estimate the degree to which the customers are actually involved/desired to be involved in the production of services, on the scale 1 to 10" vs. Responses to the question: "Please estimate the of customers' absorption of rendered services", 2013.

Figure 1. Relationship between co-production and absorption of KIBS, 2013.

Coproduction and actual absorptive capacity are therefore closely related (Spearman's correlation is 0,48 at 10 percent significance level). The correlation is not as strong as one could expect, because the groups with lowest scores for coproduction also show good absorption. The explanation (both intuitive and empirical) is that weak coproduction corresponds standard services, whose absorption demands less efforts from the customer.

The results of Figure 1 may be interpreted alternatively: despite of proper co-production, KIBS providers failed to supply services of necessary quality. This assumption is nevertheless not supported by evidence. Our survey of KIBS customers show that over 90 per cent of them are happy with rendered services. Beyond 10 per cent reported that they are not satisfied and rather not satisfied with the quality of services (with results varying from 4 per cent for users of auditing services to 18 per cent for services of business design). Only few cases of improper absorption could thus be explained by bad KIBS production. The main imperfection lies on the customers' side.

Co-production is thus crucial for proper absorption of services because it is crucial for proper tuning of services to THE customer's needs, especially in the case of customized services. Providers fail to create perfect consumer value without necessary customer cooperation. This causes not only microeconomic value losses, but macroeconomic s well. Our surveys show that in 2007-2013 from 30 to 45 per cent of rendered services were not absorbed completely. Resources that providers spent for their production were partially or completely wasted. Having in mind that KIBS production involves mostly highly qualified human recourses (as argued by Miles, 2007, and Strambach, 2008, among others, and supported by our surveys in Russia), their misuse moves the whole economy back from Pareto optimality both in quantitative and in qualitative terms.

The ability of customers to absorb KIBS may therefore be improved not only by improving of their ability to assimilate innovations, as widely shown in literature (see Zahra and George (2002) for discussion), but also by making KIBS themselves more appropriate. Cohen and Levinthal (1990) insist that absorptive capacity is strongly dependent from previous customer experience. This argument could hardly be supported empirically in developed economies whose customer firms have dozens years of practice with KIBS. But younger markets provide solid selections of both experienced and inexperienced customers. At least Russian KIBS providers deal actively with both groups, as Table 5 shows.

Table 5. Customers' expertise in KIBS, 2011.

Responses to the question: "What share of your customers falls into each of these categories in terms of their expertise in KIBS production? (Mean shares; standard deviations in brackets).

	Overall	Sectors									
		AD	MKT	ADT	IT	REC	ENG	FIN	LEG	DVP	DSGN
Experts	35.63 (30.6)	33.38 (26.3)	43.74 (30.3)	38.46 (34.5)	40.36 (32.4)	46.49 (30.6)	37.71 (33.2)	33.91 (28.0)	22.75 (27.2)	22.49 (23.7)	36.85 (31.8)
Have a general idea	37.24 (25.2)	41.68 (23.4)	35.21 (21.9)	41.54 (30.9)	36.22 (24.9)	33.49 (24.0)	32.58 (20.7)	32.45 (21.4)	38.31 (28.9)	40.42 (27.6)	38.16 (25.4)
Poor or no understanding	27.13 (26.6)	24.95 (20.2)	21.05 (21.9)	20.00 (26.5)	23.42 (26.0)	20.02 (21.4)	29.71 (27.9)	33.64 (27.5)	38.93 (33.3)	37.09 (29.4)	24.98 (24.3)

Source: ISSEK-ROMIR survey.

Relying on their experience, Russian KIBS providers strongly support the idea that experience in KIBS consumption generally makes their inexperienced customers better coproducers (see Table 6). Almost three quarters of them support the suggestion that their customers make significant progress, and only 12 per cent do not notice any improvement in their customers' expertise.

Table 6. Influence of experience in KIBS consumption on customers' co-production.

Responses to the question: "Please estimate the share of your customers who never dealt with KIBS beforehand, that became better coproducers at the end of your cooperation" (mean scores shown), 2012

	Overall	Sectors									
		AD	MKT	ADT	IT	REC	ENG	FIN	LEG	DVP	DSGN
Improves significantly	32,4	36,2	27,3	12,9	30,0	45,9	37,1	20,0	30,3	46,9	32,4
Improves insignificantly	40,1	36,2	36,4	64,5	45,0	35,1	40,0	40,0	36,4	25,0	44,1
Remains unchanged	11,9	8,5	15,2	9,7	15,0	10,8	8,6	10,0	12,1	21,9	8,8
Refuse to answer	15,6	19,1	21,2	12,9	10,0	8,1	14,3	30,0	21,2	6,3	14,7
Total number of responses	352,0	47,0	33,0	31,0	40,0	37,0	35,0	30,0	33,0	32,0	34,0

Source: ISSEK-ROMIR survey

Having in mind the close relation between coproduction and implementation in services, and relying on Cohen's and Levinthal's (1990) argument about the crucial role of prior experience for customers' absorptive capacities, we may include that extending experience in KIBS coproduction and consumption is a promising mechanism of improving the service absorption (see also Doroshenko, 2012). Experienced customers are more able to recognize the necessary level of coproduction and to coproduce properly depending on their desired level of service customization. We expect that the extension of customer involvement may visibly improve the absorptive capacity of KIBS consumers by improving their ability to recognize and to co-create proper customer value of services.

Conclusions

Cohen and Levinthal (1990) introduced the concept of absorptive capacity to describe the ability of a firm to adopt and to make good use of external knowledge. We use the empirical data to track the main components of KIBS users' absorptive capacity, i.e. their ability to recognise and to evaluate the value of services, their ability to implement services and their ability to put the services to commercial end in their core businesses. We find the value losses in all above mentioned components.

First, we prove that KIBS consumers are unable to recognise the individualisation of service properly, and they underestimate the value added by customised services and overestimate the value added by commoditised services. Both distortions deteriorate absorptive capacity and cause latent value losses due to improper choice of service supplier.

Second, we show that KIBS users are often unable to be perfect co-producers for various reasons. As a result, they obtain excess value of standardisation and lacking value of bespeaking; in both cases the value of service is beyond expectations, and its proper absorption is inhibited.

Third, we provide evidence that service implementation is not perfect, partially due to insufficient expertise of KIBS users, partially due to their insufficient motivation. Some services of proper quality are not used at all or used only partially. Consequently, direct (observed) value losses appear, especially in emerging markets for services.

We conclude that absorptive capacity of KIBS users is imperfect at all stages of their consumption cycle: supplier selection, service (co)production and final implementation. Open and latent value losses result from poor absorption, in terms of both consumer and social welfare. We prove that learning-by-doing in co-production is the main source of upgrading the customers' absorptive capacity at all stages.

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HOUSE OF SECURITY (HOS) – From Attacks Scenarios to Security System Components

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In the past organizations have tended to address various aspects of security separately, often assigning different responsibilities to different distinct departments such as Information Technology (IT), physical security and fraud prevention. Today, there is a greater recognition of the interconnected nature of security requirements and that a holistic approach is needed for preventing different types of hazards. This growing awareness informs our development of a comprehensive methodology for organizational security decision making processes and security system design.

1 Introduction

With terrorism threatening targets around the world, especially in unstable regions, and the growing sophistication of criminals and their machinations, the tasks of security managers have never been more formidable. The security system design process involves a difficult and complex balancing act that must take into account many different interests and values such as risk probabilities and costs. Each system component requires separate consideration, in tandem with analysis of the interaction between components. Understanding a client's risk perceptions and effectively communicating risk is critical in helping clients make informed decisions regarding the security system needed. Disciplines such as operations research, statistics and quality management are usually applied in order to provide a framework for constructing models of security decision making.

A variety of analytical methodologies and algorithms has been developed for this purpose. Transportation security systems have received special attention in the literature, particularly since the September 11 terrorist attacks on the U.S. (Stewart; Mueller, 2011) presented a cost-benefit analysis of Advanced Imaging Technologies (AIT) for passenger screening. (Majeske; Lauer, 2012) developed Bayesian decision models of two passenger prescreening systems: two-way and three-way classification schemes. (Xiaofeng, 2012) studied the case where passengers are categorized as one of several risk classes, according to their risk characteristics. (Lee; Jacobson, 2011) introduced passenger assignment procedures that balance the tradeoff between maximizing security and minimizing the expected duration of the passenger security process. (Hasoun et al., 2011) used elements from queuing theory in order to model illegal border crossing and security agents' reactions. (Niyazi, 2011) applied game theory to security system modeling. He implemented a Stackelberg game for analyzing resource allocation strategies to improve cargo container transportation security. (Keeney; Von Winterfeldt, 2011) developed a value model for evaluating homeland security decisions and allocating the security resources' costs effectively, using estimated values of the probability of various types of threats, vulnerability, consequences and costs.

In the main, previous research related to security decision making has focused on specific systems such as aviation transportation systems and aimed to provide deep insight into the effectiveness and utility of some devices or operation policies. The security standard (ISO 28000; 2007) was developed to organize security operations within the broader supply chain. The standard specifies the requirements for a security management system, including the aspects critical to security assurance for any organization or enterprise wishing to manage its security and activities.

The methodology proposed herein—the HOS methodology—uses a generic QFD based framework to organize security decision making and streamline the process. The QFD technique is well-known for creating a linkage between product design, customer needs and process requirements and is extended here for methodology needs. The methodology provides the client with an objective assessment of potential vulnerabilities and gaps that enable him or her to construct a risk profile. Based on the risk profile, the security engineer can propose optional security systems. The effectiveness of each security system is evaluated using the appropriate measure. The latter is based on the expected loss measure, which was developed earlier by the authors (Bashkansky et al., 2007). An ANOVA procedure is implemented to divide the set of security components into a group of dominant vital components and a complementary group of less important items. The methodology implementation is demonstrated by a detailed example of a hotel security decision making process.

2 The Methodology

Leading companies around the world have been using QFD since 1966. Its two-fold purpose is to assure that true customer needs are properly deployed throughout the design, building and delivery of a new product, and to improve the product development process itself (Akao, 2003). Typically, the approach is described in terms of a four-phase model consisting of four successive stages or matrices: (1) an overall customer requirement planning matrix (also called the HOQ); (2) a final product characteristic deployment matrix; (3) a process plan and quality control charts; and (4) operating instructions. An HOQ maps the WHATs representing desired customer product attributes define VOC Voice

of Customer (VOC) into the HOWs, the technical characteristics as viewed by the R&D staff; see (Chan, 2002) for an extensive review of the QFD literature.

This paper builds on the HOQ framework by developing a HOS that translates the security needs of an enterprise into the relative importance of the components of its existing security program according to their relative importance in meeting these needs.

The general building sequence of the HOS comprises the following six major steps:

1. Relevant Scenarios (WHATs) – Identify and classify the attackers' intentions and the relevant (plausible) attacks to the organization (the walls). Specify scenarios for every place in the organization that may be attacked.
2. Likelihood and severity of these scenarios – Assign assessments observed from security surveys; include scenario possibilities and losses when a scenario occurs.
3. System components (HOWs) – Select a structured set of relevant system components (the ceiling), i.e. technologies, people, and procedures, which are capable of preventing the identified scenario.
4. Interrelationship matrix – Evaluate the reduction in the risk of each scenario as a result of using each security component (the house's main contents). An appropriate scale is applied, illustrated by symbols.
5. Synergy/tradeoff between the system components (the roof) – For each scenario, identify which system component supports (or obstructs) another system component. These synergies can highlight innovation opportunities or bring to the fore areas that need reorganization.
6. System priorities – Calculate the system component priorities as a one bloc and for every specific place that may be attacked (the floor).
7. System effectiveness – Estimate the overall effectiveness of the security of the analyzed system. This value could be used as a selection criterion when several security systems are introduced for the same set of scenarios.

The calculation of the system components priorities takes into account the possibility that a scenario occurs, the reduction in the risk of each scenario as a result of using each security component, the loss when a scenario occurs, and the synergy between security components, given a specific scenario. The last part of this formula differentiates it strongly from the classic QFD formula. The classic QFD has one roof that presents correlations between the technical characteristics. Here we assume that correlations between the system components might change for each scenario, i.e., there are several roofs, corresponding to the number of rows in the HOS matrix.

The Analysis of Variance (ANOVA) method is utilized here for selecting the vital security components to be improved. The method is used for selecting the components to be improved. ANOVA is a method for decomposing the total variability in a set of observations, as measured by the sum of the squares of these observations from their average, into component sums of the squares that are associated with specific, defined sources of variation. (see, e.g., Montgomery, 2004). (Dror and Barad, 2006) utilized the MSE criterion as a quantitative tool for implementing the Pareto Principle. This principle was presented by Juran as a universal principle he referred to as the "vital few and trivial many". (Dror, 2010) showed that the one-way ANOVA tools, i.e., MSE, MSB and the F-statistic, are equivalent when used for dividing a group of ordered items into two groups: the vital few and the trivial many.

3 Constructing the HOS for Hotel Terrorist Attack Protection

The Relevant Scenarios (WHATs)

Hotels have often been the object of terrorist attacks. The most common kinds of such attacks are suicide bombers, car bombs, explosives, grenade assault and the taking of hostage(s). Potential attack locations: front of the hotel, entrance check point, parking area, lobby and anywhere inside the building. The left wall of the HOS includes 5 x 5-1 possible scenarios (the combination of "a car bomb inside the building" is not feasible).

The Likelihood and Severity of the Scenarios

In the second step of building the HOS (right wall), scores, based on security surveys, were assigned by experts who assessed the likelihood and severity of every scenario. In order to emphasize the dramatic character of terrorist attacks, the geometrical and not arithmetical scale of scores was used according to:

- Scenario likelihood: unlikely/weak – 1, likely/medium – 3, very likely/strong – 9
- Severity of damage to people or/and property: light – 1, medium – 3, high – 9

The System Components (HOWs)

The relevant hotel security system "hows" (components) include:

Technologies:

- Prevention devices: cameras (LPR,TV), video information analysis (VIA), entry control tools, boulders
- Alarm devices – detectors, distress/trouble buttons, siren

Human resources:

- Personnel: external, internal
- Police

Security system procedure & operating instructions

The Interrelationship Matrix

This stage of constructing the HOS is very essential, but is also almost the most painstaking and laborious part of the process. 24 what (rows) and 12 how (columns) form 288 cross cells ($I=24$, $J=12$ and $IJ=288$). Each cell contains the assessment of the extent to which the specific how might reduce the risk of occurrence or damage caused by a corresponding scenario (what) measured, as is customary in QFD, on the basis of four degrees of interaction: high interaction ($=9$), medium interaction ($=3$), low interaction ($=1$) and no interaction ($=$ blank, further considered as zero). This assessment is usually based on experts' knowledge and experience. Consensus decision making based on the Delphi method (Linstone; Turoff, 1975) was selected as the most appropriate for arriving at the final scores.

Synergy/tradeoff between the system components (the roof)

The HOS roof construction here differs somewhat from the usual QFD technique. In the context of this paper synergy/tradeoff means that two hows functioning together produce a combined result not independently obtainable. Positive or negative synergy can exist. The latter often appears as a result of tradeoff between two hows. Positive synergy occurs if interactions between two hows produce a joint effect, which is greater than the sum of the parts acting alone. In contrast to standard QFD, the presence of positive/negative synergy must be analyzed for each scenario separately.

The experts' assigned positive synergy between:

- cameras TV and VIA,
- policemen and operating instructions
- external personnel and operating instructions.

System components priorities

A system components priority can be calculated according to (1) by multiplying three score columns: likelihood, severity and the corresponding column of the interrelationship matrix. Empty cells are considered as zeros. A simple Excel© function, such as SUMPRODUCT (array1, array2, array3) can be used for this purpose.

The ANOVA based MSE method described above, when applied to these data, emphasize the following five (from twelve) components as dominant for the hotel security system: Operating procedures; TV cameras; internal personnel; entry control; visual information analysis.

The dominant components destined to protect a certain place—parking, for example—can also be partially analyzed. In this case, we utilize only the relevant part of the common matrix obtained by deleting unnecessary scenarios.

Now the dominant components preventing parking area threats are operating procedures and internal personnel.

3.7 Overall effectiveness of the security system

This value could be used as a selection criterion when several security systems are introduced for the same set of scenarios.

4 Conclusions

QFD, is a product-oriented quality technique supported by (ANOVA), a statistical technique, was applied in an innovative way to reveal the requirements of the security system to be adopted by an individual organization or the suitability of a security system already in place. The method provides useful information and understanding regarding the relative importance the management of an enterprise should attribute to its security system components as dictated by attacks scenarios as well as by its internal capabilities. QFD provides a mechanism for leveraging the security system of an individual organization. The HOS highlights potential attackers' intentions and the relevant attacks to the system and translates them into the relative importance of the security system components.

The HOS method is different from the classic QFD. In the classic QFD, a single roof presents correlations between the technical characteristics. In HOS we assume that correlations between the system components might be changed for each scenario, i.e., several roofs, corresponding to the number of rows in the House of Security matrix. Hence, the calculation of the relative importance of the system components takes the synergy/tradeoff between security components given a specific scenario into account. For comparing different security systems designed to prevent the same threats, a new effectiveness measure is proposed. Analysis of Variance (ANOVA), supports pinpointing of the vital security system components. It divides a group of items (here a set of security system components) into two groups: vital few and trivial many.

A QFD matrix is typically carried out by teams of multidisciplinary representatives from all stages of product development and manufacturing. For building the HOS, a cross functional team is established. It might include security

experts, managers, technical engineers and maintenance technicians. Among its assignments, the team would be tasked with organizing the process of extracting input information for the HOS matrix.

This paper describes the implementation of the above methodology for hotel protection from a terrorist attack. The QFD team identifies the most common kinds of attacks: suicide bombers, car bomb, explosives, grenade assault and taking of hostage(s), and potential locations of the attack in or around the hotel: front of the hotel, entrance check point, parking area, lobby, and anywhere inside the building. The HOS pointed out five vital components of the security system: operating procedures, TV cameras, internal personnel, entry control, and visual information analysis. A partial analysis to identify the most important component for protecting a certain area of the hotel (parking area) showed that the number of the vital components decreases and the dominant components for preventing parking area threats are operating procedures and internal personnel.

Our method (the HOS supported by the ANOVA method) reveals the most suitable security system structure to be adopted by an individual organization. In the case study, vital five security components were found to be the best tools for reducing the risk of attack scenarios.

The method applied in this work effectively supports the selection of vital security system components. It emphasizes adopting a systemic approach for selecting the vital security system components in response to attack scenarios.

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Technology adoption in service organizations: a framework proposal for studying ICT diffusion in healthcare and hospital services

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The aim of this paper is to outline a framework for the study of Information and Communication Technology (ICT) diffusion in healthcare and hospital services having Rogers's innovation decision process (1983) as a background. To do so, we sought publications on the topic from the last 10 years. After gathering dozens of organizational and individual determinants of technology adoption, the next step was to lay these factors throughout the stages of this adoption's decision-making process. This study aims to contribute with research efforts that address facilitating or inhibiting factors of ICTs adoption getting the Innovation Diffusion Theory close to the many conditioning factors of the adoption of ICTs.

1 Introduction

Innovation is defined as a well succeed exploitation or transformation of ideas into products, processes, business models, or more profitable services when it deals with taking higher risks, being essential to competitiveness (Tether, 2003). Its development process encompasses decisions and impacts that come from the recognition of problems through research; development and commercialization of an innovation; and the diffusion and adoption of innovations by users. Diffusion, in turn, assumes the role of a process by which innovation is transmitted to the members of the social system through communication channels (Rogers, 1983).

In this context, the diffusion of technologies goes through an important innovation decision process supported by the IDT in Rogers (1983). It seems to be about a sequential linear stage model of the innovation decision-making process, which simplifies the complexity that may exist in the adoption of technological innovations and innovations in services, including the intrinsic to hospital services.

Barlow (2013) argues that the diffusion of innovations can be explained by the making of individual decisions, linking innovation and the adopters who make up the organization.

According to England and Stewart (2007), innovation can be interpreted as a process of adopting new technologies, methods and ideas, which is essential to the development of healthcare organizations. Innovation in this area comprehends the development or improvement of the clinical practice, of the support services design, of the physical infrastructure and of technologies. It also affects the health care delivery models and the demand for hospital beds. Therefore, the diffusion and adoption of innovations in health care is a challenge, because it deals with the complexity of health services and involves multiple stakeholders (Barlow, 2013). In the case of healthcare services, innovations are responsible for major changes in the results and obviously for an increase in expenditure (Rye, Kimberly, 2007).

The studies on factors that condition the adoption of innovations are capable of making the decision-making processes more effective, both at an individual organization level or at an organizational system level, through more effective political decisions. For this reason, it is essential to understand the facilitating and inhibiting – or conditioning – factors of its diffusion in this context (Rye, Kimberly, 2007).

The ICT is a linkage between telecommunications and computing technologies, which is able to improve work routines and is influenced by organizational, technological, economic and individual factors (Bouwman et al., 2005). In the extent of this work, it is timely to discuss and understand that on the one hand, the organizational perspective addresses all factors related to the nature of the organization and to the environment in which it operates, and on the other hand, the individual perspective considers all factors associated with the acceptance, the attitude, the intention, the propensity and readiness to use technology and the after-use of the individual, as well as, factors related to the users perception of technology (Bouwman et al., 2005).

Due to the importance of the innovation decision process developed by Rogers (1983), employing the same logic to studies on technology adoption in health services organizations can be helpful. However, it was noticed, as a gap, the need to catalogue, discuss and allocate factors that intervene in the process of adopting technologies, so that they were arranged in each one of the adoption stages, since, although the idea is not to propose hermetic boxes that enclosure sets of variables as corresponding only to each particular step, it is perceived as relevant to organize and distribute them among the process steps in order to guide upcoming research work.

Thus, this paper aims to outline a framework for the study of the diffusion of ICT in healthcare and hospital services, having as background the innovation decision process proposed by Rogers (1983), which involves the prior conditions and five decision stages (knowledge, persuasion, decision, implementation and confirmation), and suggesting which conditioning factors of the diffusion of ICT from the organizational and individual (attitudinal, cognitive and behavioural) perspective are evident in each phase of this process.

2 Method

This work relies on a method of logical and descriptive exposition of the scientific literature about the diffusion of technologies in healthcare and hospital services, in a mainly qualitative, essayist and reflexive approach. For this, the literature review that guided this study used the descriptors 'diffusion', 'adoption', 'acceptance', 'innovation', 'health', 'hospital', 'information', 'technology' and 'ICT' (Information and Communication Technology). These searches were done in journal repositories in scientific databases that encompass the Science & Technology, Social Sciences, and Health & Medicine areas. The selected databases were: Applied Social Sciences Index and Abstracts (ASSIA); ERIC; Library and Information Science Abstracts (LISA); Social Services Abstracts; Sociological Abstracts; and Technology Research Database, taking into consideration a ten-year period, the period between 2004 and 2014. The kinds of sources used were dissertations and theses, academic journals and conference procedures and works, and the kinds of documents were articles, conference articles, dissertations and theses. The searches were done through the ProQuest database.

Following these parameters, the search returned 51 publications, 37 among them were full texts that could be accessed, from which 21 were considered appropriate to the research topic, as shown in Table 1. To avoid finding many unrelated publications, the authors worried about making small searches, alternating descriptors and rotating between terms that should be in the titles or in the abstracts of the publications. With this, a greater adherence of results to the theme was assured.

Table 1. Results of scientific publications based on searches in ProQuest database.

Searches	Descriptors	Result	Accessible	Adequate
1	Abstract (Information Technology) AND title ((diffusion OR adoption)) AND abstract (innovation) AND title ((health OR hospital))	7	4	4
2	Abstract (acceptance) AND title ((ICT OR technology)) AND title ((health OR hospital))	30	21	11
3	Title (diffusion) AND title (innovation) AND title ((health OR hospital))	5	5	1
4	Title (adoption) AND title (innovation) AND title ((health OR hospital))	6	5	4
5	Abstract (acceptance) AND title (innovation) AND title ((health OR hospital))	3	2	1
Total		51	37	21

All choices in the literature searches reported in Table 1 were based on knowledge of the diffusion of innovations present in Rogers (1983). Thus, it was possible to see, for example, the proximity between the words 'diffusion', 'adoption' and 'acceptance', which lead to the possibility of alternating them in each one of the searches. For that reason, it is possible to notice that in a way the searches complemented each other, as to cover all the initial parameters and decrease the occurrence of possible gaps left by one or another.

After collecting the full texts, all of them went through the first recognition stage, reading the titles, abstracts and keywords. The publications that were outside the scope of the research were discarded and, then, the remaining publications underwent a second sorting, a complete reading. Thereafter, the selected publications were registered and detailed according to the kind of publication, authorship, affiliation, country, journal, year, keywords, classification methodology, objectives and results.

Most publications (61.8%) were from Taiwan (23.8%), from the United States (19.0%) and from the UK (19.0%), 13 publications in total, considering the country of origin of the first and the second author's institutions identical in all cases. It was also observed that most of the publications came from authors affiliated to the National Chung Cheng University (Taiwan), to the Harvard Medical School (USA) and to the University of the West of England (UK) tied with the University of Wisconsin-Madison (USA), considering all authors of each publication. In addition, the highest production years, based on the found publications, were 2007, 2009 and 2012.

It is also important to mention that other studies, apart from those selected, were used to build this essay, directly promoting the objective of the research, or establishing concepts and knowledge needed to achieve it.

3 Innovation Diffusion Theory

With the Innovation Diffusion Theory (IDT), Rogers (1983) deepened the understanding of the diffusion and adoption of innovations, which he sometimes uses as a synonym to technology, process.

According to Rogers (1983), the decisions and events prior to the first adoption of an innovation strongly affect the diffusion process. To the author, an innovation is like an idea, practice or object seen as new to an individual or to another party involved in the adoption and has five basic attributes, namely: relative advantage: "the degree to which an

innovation is perceived as better than the idea it supersedes”; compatibility: “the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters”; complexity: “the degree to which an innovation is perceived as difficult to understand and use”; trialability: “the degree to which an innovation may be experimented with on a limited basis”; and observability: “the degree to which the results of an innovation are visible to others” (Rogers, 1983, 15, 16).

According to Rogers (1983), the innovation adoption process covers decisions, activities and impacts that come from needs or problems, through either research, development or commercialization of innovations. In this process, the individual or other decision-making units, initially, strive to gain knowledge about an innovation to, then, take an attitude towards it. From that moment, it is possible to decide to accept or reject it, and if it is accepted, the decision implementation and confirmation phases follow (Figure 1).

Thus, the process of adopting technological innovations involves a number of choices and actions in the midst of uncertainties and their conditioning factors.

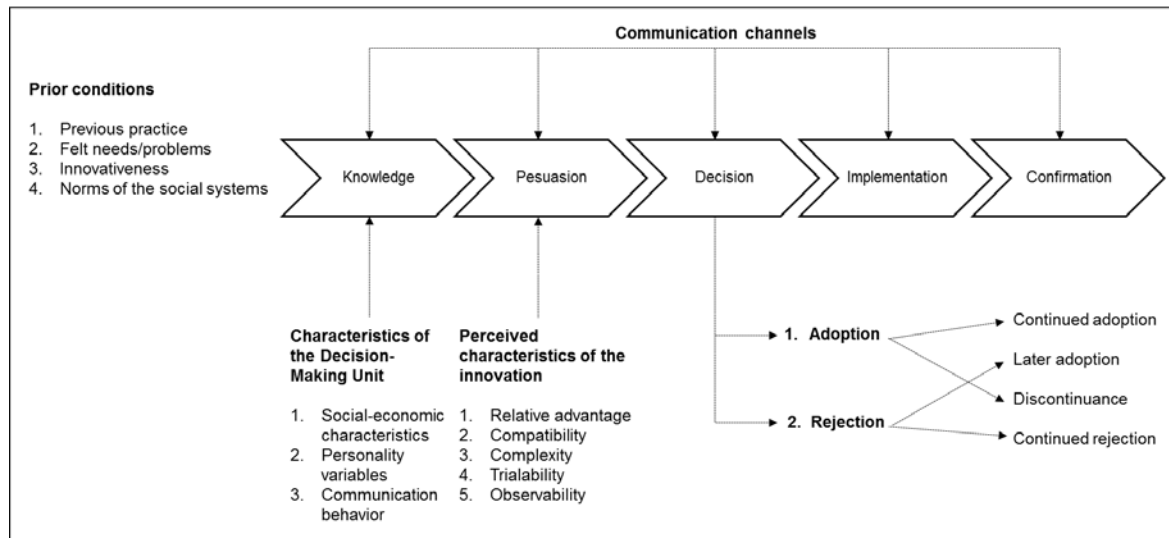


Figure 1. Innovation-Decision Process

Source: Rogers (1983).

Observing the initial conditions that can affect the innovation decision process, Rogers (1983) gives four kinds of necessities to the understanding of prior conditions, which includes the set of existing practices, the perceived needs and problems, the innovativeness and the social systems standards. Innovativeness is the degree to which an individual unit or another adoption unit is relatively incipient in adopting new ideas from other members of a system. The degree of innovativeness and the ranking of the members of the system into categories (innovators, early adopters, earlier majority, late majority and laggards) are based on the relative time in which an innovation is adopted (Rogers, 1983).

After understanding the prior conditions, the process goes through five phases or stages (Rogers, 1983), as follows:

1. **Knowledge:** happens when an individual or another decision-making unit is exposed to an existing innovation and understands how it works. This step includes the characteristics of the decision-making units in relation to the socioeconomic aspects, to the personality variables and to the communication behaviour.
2. **Persuasion:** happens when an individual or a decision-making unit forms a favourable or unfavourable attitude to the innovation. This phase is influenced by the perceived characteristics of the innovation (relative advantage, compatibility, complexity, trialability and observability).
3. **Decision:** happens when the individual or the decision-making unit creates efforts in activities that lead to the choice between the adoption and rejection of the innovation.
4. **Implementation:** happens when an individual or a decision-making unit puts into use a new idea. Implementation problems are more serious when it comes to an organizational adoption, because it involves many individuals, who can be more resistant than one. Rogers (1983) also mentions the reinvention, which is an innovation that undergoes changes made by its many adopters.
5. **Confirmation:** happens when an individual seeks reinforcement to an innovation decision already made. Here, attitudes have a relevant role.

The model also proves to be very useful for both theory and practice, because its sequential linearity simplifies the complexity intrinsic to the process, which, naturally, in practice, when the transition between stages happens, is not always so clear or easy. According to Oxford Dictionary of English (2010), diffusion as a noun is the spreading of something more widely (i.e. the rapid diffusion of ideas and technology). However, the diffusion should not be naively understood (Latour, 2000). If we search the meaning of the term ‘diffused’ in other sources, we will see that something diffused is something without a clear shape, something that is, many times, confusing (Dicionário Online de Português, 2014). Therefore, it is believed that the diffusion process, taking into consideration each one of its stages, drawn

according to Rogers (1983), is permeated by the organizational and individual factors that will hinder or contribute to the success and fluidity of the process and its consolidation.

4 Theoretical Approaches on Technology Adoption

For Rogers (1983), technology has two key components: (1) hardware, which is a tool that incorporates the technology as a physical material or as objects, and (2) software, which is the database for the tool. According to this author, a technological innovation can incorporate information and reduce uncertainties about the cause and effect relationship in solving problems, and, at the same time, it can create uncertainties for the potential adopters.

Thus, from the 1960s until 2014, several studies were developed with the intent of understanding the attitudes, the use intentions and the behaviour towards the adoption of technologies. Seeking an explanation for the impact of the intentions on the individuals' behaviour, two major theories have been developed, the Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB). They were dealt with in Agarwal (2000) and in Ajzen and Fishbein (1977).

In 1989, Davis introduced the Technology Acceptance Model (TAM), aiming at the validation of measurement scales for two different constructs: perceived usefulness and ease of use, which mean, respectively, how much an individual believes that a system is useful for improving their performance at work and how much he believes that using a system would require less effort. The author dealt with the users' acceptance, linking the variables 'perceived usefulness' and 'ease of use' to the use intention and to behaviour, theories elucidated in TRA and TPB.

Then, Venkatesh and Davis (2000) proposed extending TAM to TAM2, which incorporated new constructs, since the TAM model explained around 40% of the variance in use and behavioural intention (Davis, 1989). The new constructs include processes of social influence and cognitive instrumental processes, including subjective norms, voluntariness, image, job relevance perception, output quality and demonstrability of the result.

Considering the various existing models and theories, Venkatesh et al. (2003) compared eight information technology acceptance models, for the development and validation of a unified model, called the Unified Theory of Acceptance and Use of Technology (UTAUT). In this model, the use behaviour is created by a series of interactions between intention and use determinants, namely: intention of use, performance expectancy, effort expectancy, social influence, facilitating conditions and key variables that moderate the relationship between influencing variables and the technology use intention: gender, age, experience and voluntariness of use. Thus, the UTAUT established itself as a support to managers in ascertaining the success probability of the technology adoption, in a more targeted to the context of the organizations way. Recently, it has been extended to the UTAUT2 model, which emphasizes the more focused on the technology user perspective study, adding three constructs to the basic model, namely: hedonic motivation, price value and habits (Venkatesh; Thong; Xu, 2012).

Parasuraman and Colby (2001) also contributed to the study of technology adoption, regarding the readiness of individuals, when they proposed the Readiness Technology Index (TRI), in which they presented facilitating (optimism and innovativeness) and inhibiting (discomfort and insecurity) factors of technology adoption.

In a sort of evolution of the TRI, although the authors claim that this was not their purpose, Ratchford and Barnhart (2012) developed the Technology Adoption Propensity Index (TAP-I), whose suggested scale consists of 14 items that combine the evaluation of attitudes and beliefs, of people who may or may not be users of technologies, using as analysis dimensions two inhibiting factors (vulnerability and dependence) and two facilitating factors (optimism and proficiency).

All these approaches emphasize the concerns with acceptance, readiness, use propensity, attitudes and use intention shown by technology users or potential users, but they focus heavily on prior to the adoption or implementation phases.

Jasperson, Carter and Zmud (2005), discussed research about behavioural use on the post-adoption phase of Information Technology (IT) and suggested a research agenda on the factors that influence users to explore and expand the technologies contained functionality. These authors define the post-adoption behaviour as feature adoption decisions, feature use behaviours and feature extension behaviours use, all made after the adoption of the technology, when it is accessible to users and adopted to fulfil their work routines.

In another way, Rogers (1983) offers a very similar to this one by Jasperson, Carter and Zmud (2005) discussion, even though he does not directly talk about post-adoption. He deals with the reinvention, which in his proposal is addressed in the implementation stage of the innovation process. Therefore, Rogers (1983) did not establish a post-implementation or post-adoption phase, but talked about the flexibility of certain innovations, which gives the opportunity of reinvention for the users who try the process of adopting a technology. Thus, an innovation is not invariable and the adoption experience contributes to how it will be used in the user routines.

Advancing on the discussions of what can also be called post-adoption, Bagayogo, Lapointe and Bassellier (2014) sought to understand how individuals can improve the use of IT, after its adoption. Thus, they interviewed users of different applications of IT in different situations and showed that the improvement of the use and of its patterns is defined by variables associated with the technology, the users and their tasks.

5 Conditioning Factors of ICT Adoption and Diffusion in Healthcare and Hospital Services

According to Burke et al. (2002), the skills acquired through the adoption of ICTs in the health services area in the 2000s, provided the development of computerized processes of data and integration of administrative and clinical information. Therefore, the chances of increasing the adoption of IT and of expanding its functionalities become high (Burke et al., 2002).

Cresswell and Sheikh (2013) state that the diffusion and the adoption of IT in healthcare reveal many difficulties related to the diversity of technical, social and organizational factors. They contributed with a description of the main results on each of the three factors, as shown in Table 2. They also observed some gaps in the currently developed research on technologies diffusion, which need to be investigated in the future: environmental influences, connection between adopters and organizational attributes; and noticed that the final users are not opposed to the technologies, but resist their use. This happens because the final users see the technologies as inadequate or invasive to their values, aspirations and personal or social rules (Alexander; Staggers, 2009, Boonstra; Broekhuis, 2010, Gagnon et al., 2010, Keshavjee; Bosomworth, 2006, Ludwick; Doucette, 2009, Yarbrough; Smith, 2007, Yusof, Stergioulas, Zugic, 2007 apud Cresswell; Sheikh, 2013). Cresswell and Sheikh (2013) gathered information found in several studies published between 1997 and 2010.

Table 1. Determinant factors that influence innovation diffusion or adoption.

Source: Cresswell and Sheikh (2013, e76, e81).

Factors	Descriptions and references
Technical	Early demonstrable benefits; perceived ease of use; costs; the extent to which a system is interoperable with existing technology; the extent to which technology fits in with existing organizational processes; and the extent to which it can be trialled (Gagnon et al. (2010), Yarbrough; Smith, 2007 apud Cresswell; Sheikh, 2013).
Social	Information technology literacy and general competencies of users (Keshavjee; Bosomworth, 2006, Ludwick; Doucette, 2009, Yarbrough; Smith, 2007 apud Cresswell; Sheikh, 2013); personal and peer attitudes toward an innovation (Gagnon; et al., 2010, Yarbrough; Smith, 2007 apud Cresswell; Sheikh, 2013); financial considerations (Boonstra; Broekhuis, 2010, Gagnon, et al., 2010 apud Cresswell; Sheikh, 2013); the extent to which the technology supports inter-professional roles and working; on-going involvement of key stakeholders (management, developers and users) at the conception and design stages (Gurses; Xiao, 2005 apud Cresswell; Sheikh, 2013); and opportunity for field testing of early prototypes and open communication channels (Gagnon; et al., 2010, Keshavjee; Bosomworth, 2006, Yusof; Stergioulas; Zugic, 2007 apud Cresswell; Sheikh, 2013).
Organizational	Organizational leadership; and Support to boundary spanning and reduction of the gulfs between technology, users, managers and clinicians (Boonstra; Broekhuis, 2010, Gruber et al., 2009, Gagnon; et al., 2010, Keshavjee; Bosomworth, 2006, Ludwick; Doucette, 2009, Yusof; Stergioulas; Zugic, 2007 apud Cresswell; Sheikh, 2013).

As it can be observed, the study by Cresswell and Sheikh (2013) presents several variables previously considered in the works proposed by Rogers (1983), Davis (1989) and Venkatesh and Davis (2000), although it does not mention them directly.

Furthermore, for the diffusion of technological innovations in healthcare and hospital services, it is essential to know the key values that the technologies are able to create, which according to Ghodeswar and Vaidyanathan (2006), are the disease prevention, the ease of suffering and the improvement of the quality of life of people who seek some kind of treatment. In line with this, a Health Information Technology (HIT) is able to change healthcare services, because it involves data processing at a hardware and software level to store and share information that supports the decision (Thompson; Brailer, 2004 and Kim, Park, 2012).

Alkrajji, Jackson and Murray (2011) studied the process of adopting technology (HIT) in Saudi Arabia, and exposed various factors that affect the decision for its adoption. The most relevant factors, according to the mentioned authors, are: network externalities related with communication channels; external pressure of the government; integration of system with the existing ones; accreditation of technology adoption; standards benefits; organization characteristics – organization size (i.e. number of beds, employees), organization type (i.e. research centre, university hospital), organization structure (i.e. regional or corporate structure), organization culture (i.e. turnover rate, absence rate, nationalities), organization complexity; the degree of politics in the organization and the degree of bureaucracy in the organization; policy and procedures; clinician engagement; standards cost (direct and indirect); and external support (vendors or consultants).

Holden and Karsh (2009) conducted a literature review on the adoption of HIT in order to ascertain whether the use of existing theories to develop testable models of HITs benefited both research and practice and found that this is true. Specifically, they found that

ease of use (or usability) may be the result of HIT that fits with user abilities and task requirements. To achieve it: (1) adjustments can be made to the HIT interface to make it more user friendly by building in help features or by making design more consistent with clinicians' mental models, (2) clinicians can be provided with more training or time to practice using the system, perhaps in a separate room used for carrying out HIT emulation, or (3) the task can be redesigned in any number of ways.

Lin, Lin and Roan (2012) set out to investigate the physicians' reactions to the electronic medical record with emphasis on managerial issues, specifically regarding the barriers, threats and inequality, all perceived in relation to technology. 115 physicians from six different hospitals were interviewed and the results revealed that a perceived threat directly and negatively affects the usefulness and the behavioural intention. The Perceived inequity has a direct and positive effect on the perceived threat and a negative effect on the perceived usefulness, and an indirect impact on the behavioural intention.

Emani et al. (2012) conducted a survey with 760 patients in order to apply the innovation diffusion model for the study of the Personal Health Records (PHRs) technology, this way, they tested and confirmed several predictors of the value of this HIT pointed out by Rogers (1983), Davis (1989), Venkatesh and Davis (2000) and others, namely: relative advantage, ease of use, trialability, perceptions of privacy and security, age and computer use. They got to the conclusion, therefore, that the innovation diffusion model fits in the PHR perception study and provides an appropriate basis to identify factors that distinguish PHR users from non-users.

Lai, Lin and Tseng (2014) identified determinants in the adoption of the Radio Frequency Identification (RFID), a technology that performs automatic data collection and tracking of assets and people, including in hospital services. In a sample of 102 hospitals, the authors found that cost; ubiquity that is the capacity to transmit communicate, monitor, and control signals to individuals or objects to perform various functions, regardless of users' whereabouts (Lai; Lin; Tseng, 2014, 5); compatibility (Rogers, 1983); security and privacy risk; top management support; hospital scale, large-scale hospitals are more likely to adopt innovative technology than the small ones, according to Chang et al. (2007 apud Lan; Lin; Tseng, 2014); financial readiness, installation costs, implementation and maintenance (Kim and Garrison, 2010 apud Lai, Lin and Tseng, 2014); and government policy, government's financial support, training curriculum, specification and policy stability, according to Chang et al., (2006 apud Lai; Lin; Tseng, 2014); are the critical factors most impactful in the adoption of RFID technology in hospitals.

Hung et al. (2010) proposed and tested an integrated model that incorporates organizational and technological or systemic factors as key determinants of the adoption, in healthcare institutions, of the Customer Relationship Management System (CRMS), an ICT that makes the process of establishing, developing and maintaining the relationships with customers in medical centres, regional hospitals and community hospitals, easier. Through carrying out a series of surveys in medical centres, regional hospitals and community hospitals in Taiwan, the authors found out that the attributes hospital size, the system capabilities of staff, innovation of senior executives (senior executives are the critical people in determining the organizational attitude towards innovation, so, their ability, preferences and readiness to change are critical to the innovation decision), knowledge management capabilities, and relative advantage, have significant influence on the CRMS adoption.

Vasileiou, Barnett and Young (2012) conducted in-depth interviews with 18 main informants of 15 successful innovations in health services in the UK, innovations awarded by the Health Service Journal, with the aim of studying the usefulness of the innovations in health services. The results showed that the innovators articulated concepts related to the main existing in the British National Health Service approaches, namely: clinical trials and improvement cycles. They found out that health services need individuals who have technical knowledge.

Marsan and Paré (2013) developed research on the antecedents of the decisions to adopt OSS (Open Source System) in healthcare organizations. Through 18 semi-structured interviews with IT experts from the health and social services sector in the Province of Quebec, Canada, they found eight factors that influence the adoption of this technology, grouped as follows: software characteristics (low cost, right to use and compatibility with organizational needs); characteristics of organizations to absorb OSS (internal IT resources availability and internal expertise in open source software); and characteristics of external environment in relation to institutional pressures and public discourse about OSS (external expertise in OSS, vision and leadership by departmental authorities with regard to software adoption, community interest and clarity, consistency and richness of the OOS public discourse).

Chen et al. (2008) aimed to verify the behaviour intention of nurses tied to public health (Public Health Nurses - PHNS) in relation to web-based learning in pre-implementation stage. They also aimed to identify the nurses' intervener factors, based on TAM, by means of a 202 nurse's sample. They noticed great chances of technology adoption. Moreover, they found that perceived usefulness is the factor that most directly affects the behaviour intention, which is indirectly influenced by the factors perceived ease of use, individual's computer competency and Internet access at workplaces. All these factors that directly or indirectly impact have a positive effect for a greater behaviour intention, in the nurses' case.

Hung Tsai and Chuang (2014) studied nurses' use behaviour of the Primary Health Information System (PHIS) technology, which supports primary health care with the ability to improve the practice and delivery of healthcare services quality. Through the application of 768 questionnaires with primary healthcare nurses, they found that the compatibility factor has a positive impact on the perceived usefulness and trust in relation to the ICT. They got to the conclusion that if the nurses see the technology as reliable, they become more prone to the perceived usefulness and, with this, it is possible to establish a favourable attitude.

Focusing on individual perceptions, Aggelidis and Chatzoglou (2009) set out to develop and test a modified version of the TAM model (Davis (1989)), they also considered other models presented in the literature based on the Hospital Information Systems (HIS). On the main data collection phase, 341 users of these systems from the main public hospitals of the East Macedonia and Thrace region answered the questionnaire via personal interviews. The results showed that perceived usefulness, ease of use, social influence, attitude, facilitating conditions, self-efficacy (individuals with higher self-efficacy are more likely to experience positive effects than individuals with lower self-efficacy) and, indirectly, training significantly impact the behaviour intention of the people in accepting technologies in healthcare organizations.

Kim and Park (2012) made a study aimed at developing and testing a model that described the behaviour intention and the health behaviour of various HIT consumers. The proposed model, which the authors called Health Information Technology Acceptance Model (HITAM), is an extension of the TAM. Kim and Park (2012) interviewed 728 members of the three largest online health portals in South Korea and, based on the results, categorized factors that affect the behaviour intention for measurement, storage and healthcare data management, in the health zone, in the information zone and in the technology zone. The first one is processed from the health status to perceived threat, to perceived usefulness, to attitude and to behavioural intention. In the information zone, the factors are the perceived usefulness, which gets subjective norms influences. Finally, in relation to the technology zone, it has technology use forms, technology reliability, output quality and result demonstrability, which affect the perceived usefulness (Kim, Park, 2012).

Ketikidis et al. (2012) also tested the TAM model with some new proposals in order to investigate the beliefs and acceptance of the HIT with health professionals. Thus, Ketikidis et al. (2012) conducted 133 valid interviews with doctors and nurses from three clinics of the city of Skopje, Republic of Macedonia, in order to evaluate the intention of use of HIT predictors and found that ease of use, relevance norms and subjective norms could directly predict the intention of use of this technology.

According to Holden and Karsh (2010), the growing interest in the reactions, behaviours and attitudes of technologies users in healthcare indicated the importance of theories focused on technology acceptance, use, readiness, propensity, among others. The authors made a literature review of 16 data sets analysed in over 20 health clinical studies. In relation to the application of the TAM model (Davis, 1989; Venkatesh and Davis, 2000), the authors decided to evaluate the future of the TAM applied to health services based on its past. The results showed that the model is able to predict a considerable part of the acceptance of technologies in healthcare, and that the theory can generate benefits to the original model, either through its amendment or extension.

Kijsanayotin, Pannarunothai and Speedie (2009), stating the relevance of the acceptance and use HIT in community health centres of Thailand theme, applied the UTAUT (Venkatesh et al., 2003) in order to test and confirm factors involved in the adoption of this technology. Thus, through questionnaires administered in 12 Thailand provinces, with 1,607 Community Health Centres (CHCs), they found out that individuals who worked in the health centres showed a high level of acceptance and use of the technology. The researchers confirmed that the factors performance expectancy, effort expectancy, social influence, voluntariness, previous experiences with technology, intention of use and facilitating conditions are able to predict the acceptance and use of a health IT system in community health centres.

In view of the studies reviewed until here, two tables are elaborated. They gather all conditioning factors presented separately in organizational (Table 3) and individual factors (Table 4) and their respective references. Initially, the idea was to divide the tables into facilitating and inhibiting factors to the organizational and individual perspective, but when making the process of cataloguing the variables, it was noticed that the same factor can play both roles, creating redundancies. Therefore, we used the terms: conditioning factors.

It is important to highlight that Ward et al. (2007) conducted a literature review on factors that impact the attitudes related to the technologies in health services and verified that the Health Care Practitioners (HCPs) are important for the acceptance and use of technologies. Therefore, they stressed that there is a gap in the study of the subject, which is little exploration of the factor 'change of attitudes' of the HCPs regarding adoption of technologies.

Table 2. Organizational conditioning factors that influence technology adoption.

Organizational conditioning factors	References
1. Availability of resources	Rye and Kimberly (2007)
2. Clarity, consistency and richness of technology	Marsan and Paré (2013)
3. Clinician engagement	Alkraihi, Jackson and Murray (2011)
4. Communication channels	Cresswell and Sheikh (2013)
5. Community interest in technology	Marsan and Paré (2013)
6. Compatibility with organizational needs	Marsan and Paré (2013)
7. Demonstrability of the results	Kim and Park (2012); Venkatesh and Davis (2000)
8. Direct and indirect costs involved	Cresswell and Sheikh (2013); Ghodeswar and Janardan (2006); Lai, Lin and Tseng (2014); Marsan and Paré (2013); Rye and Kimberly (2007)
9. External expertise	Marsan and Paré (2013)
10. External pressure of the government	Alkraihi, Jackson and Murray (2011)
11. External support in case of complexity	Alkraihi, Jackson and Murray (2011)
12. Facilitating conditions	Aggelidis and Chatzoglou (2009); Kijasanayotin, Pannarunothai and Speedie (2009); Venkatesh et al. (2003); Venkatesh; Thong; Xu (2012)
13. Felt needs/problems	Rogers (1983)
14. Government policy	Chang et al., (2006); Lai, Lin and Tseng (2014)
15. Innovativeness	Parasuraman and Colby (2001); Rogers (1983)
16. Integration of system	Alkraihi, Jackson and Murray (2011)
17. Internal expertise	Marsan and Paré (2013)
18. Internal IT resources availability	Marsan and Paré (2013)
19. Internet access	Chen et al. (2008)
20. Interoperability considerations	Cresswell and Sheikh (2013)
21. knowledge management capabilities	Hung et al. (2010)
22. Innovation of senior executives	Hung et al. (2010)
23. Level of patient demand	Ghodeswar and Janardan (2006)
24. Network externalities	Alkraihi, Jackson and Murray (2011)
25. Norms of the social system	Rogers (1983)
26. Organizational ability to reinvention	Ghodeswar and Janardan (2006)
27. Organizational and financial readiness	Alkraihi, Jackson and Murray (2011); Cresswell and Sheikh (2013); Ghodeswar and Janardan (2006); Kim and Garrison (2010); Lai, Lin and Tseng (2014)
28. Organizational leadership	Cresswell e Sheikh (2013)
29. Organizational learning, climate and attitude	Rye and Kimberly (2007)
30. Organizational policy and procedures	Alkraihi, Jackson and Murray (2011)
31 Organizational size	Alkraihi, Jackson and Murray (2011); Chang et al. (2007); Hung et al. (2010); Lai, Lin and Tseng (2014)
32. Previous practice	Rogers (1983)
33. Reduction of the distance between technology, users and managers	Cresswell and Sheikh (2013)
34. Right to use	Marsan and Paré (2013)
35. Risk level	Ghodeswar and Janardan (2006)
36. Security and privacy risk	Lai, Lin and Tseng (2014)
37. Social economic characteristics	Rogers (1983)
38. Stakeholder involvement	Cresswell and Sheikh (2013)
39. Standards benefits	Alkraihi, Jackson and Murray (2011)
40. Standards cost (direct and indirect)	Alkraihi, Jackson and Murray (2011)
41. Support to boundary spanning	Cresswell and Sheikh (2013)
42. System capabilities of staff	Hung et al. (2010)
43. Technology adoption accreditation	Alkraihi, Jackson and Murray (2011)
44. Technology customization	Holden and Karsh (2009)
45. Technology fits in with existing organizational processes	Cresswell and Sheikh (2013)
46. The extent to which the technology supports inter-professional roles	Cresswell and Sheikh (2013)
47. Training or time to practice using the system	Aggelidis and Chatzoglou (2009); Holden and Karsh (2009)
48. Top management support	Lai, Lin and Tseng (2014)
49. Vision and leadership by departmental authorities with technology adoption	Marsan and Paré (2013)
50. Ubiquity	Lai, Lin and Tseng (2014)

Table 3. Individual conditioning factors that influence technology adoption.

Individual conditioning Factors	References
1. Age	Emani et al. (2012); Venkatesh et al. (2003); Venkatesh; Thong; Xu (2012)
2. Attitudes	Aggelidis and Chatzoglou (2009); Hung, Tsai and Chuang (2014); Kim and Park (2012); Rogers (1983); Ward et al. (2007)
3. Behavioural intention	Chen et al. (2008); Davis (1989); Kim and Park (2012); Lin, Lin and Roan (2012); Venkatesh and Davis (2000); Venkatesh et al. (2003); Venkatesh; Thong; Xu (2012)
4. Comfort to use technology	Parasuraman and Colby (2001)
5. Communication behaviour	Rogers (1983)
6. Dependence to use technology	Ratchford and Barnhart (2012)
7. Effort expectance	Kijsanayotin, Pannarunothai and Speedie (2009); Venkatesh et al. (2003); Venkatesh; Thong; Xu (2012)
8. Gender	Venkatesh et al. (2003); Venkatesh; Thong; Xu (2012)
9. Habits	Venkatesh; Thong; Xu (2012)
10. Hedonic motivation	Venkatesh; Thong; Xu (2012)
11. Image or status in use of innovation	Venkatesh and Davis (2000)
12. Individual's competency	Chen et al. (2008); Cresswell and Sheikh (2013)
13. Intention of use	Davis (1989); Ketikidis et al. (2012); Kijsanayotin, Pannarunothai and Speedie (2009); Venkatesh and Davis (2000); Venkatesh et al. (2003); Venkatesh; Thong; Xu (2012)
14. Job relevance perception	Venkatesh and Davis (2000)
15. Optimism	Parasuraman and Colby (2001); Ratchford and Barnhart (2012)
17. Output quality	Kim and Park (2012); Venkatesh and Davis (2000)
18. Perceived as appropriate technology	Cresswell and Sheikh (2013)
19. Perceived ease of use	Aggelidis and Chatzoglou (2009); Cresswell and Sheikh (2013); Chen et al. (2008); Davis (1989); Emani et al. (2012); Holden and Karsh (2009); Ketikidis et al. (2012); Venkatesh and Davis (2000)
20. Perceived inequity	Lin, Lin and Roan (2012)
21. Perceived privacy and security	Emani et al. (2012); Parasuraman and Colby (2001)
22. Perceived price value	Venkatesh; Thong; Xu (2012)
23. Perceived threat	Kim and Park (2012); Lin, Lin and Roan (2012)
24. Perceived reliability	Hung, Tsai and Chuang (2014); Kim and Park (2012)
25. Perceived Usefulness	Aggelidis and Chatzoglou (2009); Chen et al. (2008); Davis (1989); Hung, Tsai and Chuang (2014); Kim and Park (2012); Lin, Lin and Roan (2012); Venkatesh and Davis (2000)
26. Performance expectance	Kijsanayotin, Pannarunothai and Speedie (2009); Venkatesh et al. (2003); Venkatesh; Thong; Xu (2012)
27. Personal and peer attitudes toward an innovation	Cresswell and Sheikh (2013)
28. Personality variables	Rogers (1983)
29. Previous experience with technology	Kijsanayotin, Pannarunothai and Speedie (2009); Venkatesh et al. (2003); Venkatesh; Thong; Xu (2012)
30. Proficiency in use of technology	Ratchford and Barnhart (2012)
31. Self-efficacy	Aggelidis and Chatzoglou (2009)
32. Social influence	Aggelidis and Chatzoglou (2009); Kijsanayotin, Pannarunothai and Speedie (2009); Venkatesh et al. (2003); Venkatesh; Thong; Xu (2012)
33. Subjective and relevance norms	Ketikidis et al. (2012); Kim and Park (2012); Venkatesh and Davis (2000)
34. Technical knowledge	Vasileiou, Barnett and Young (2012)
35. Technological compatibility, complexity, observability, relative advantage and trialability	Cresswell and Sheikh (2013); Emani et al. (2012); Ghodeswar and Janardan (2006); Hung et al. (2010); Hung, Tsai and Chuang (2014); Lai, Lin and Tseng (2014); Marsan and Paré (2013); Rogers (1983)
36. Views and beliefs of executives enablers of adopting technologies	England and Stewart (2007)
37. Voluntariness of use	Kijsanayotin, Pannarunothai and Speedie (2009); Venkatesh and Davis (2000); Venkatesh et al. (2003); Venkatesh; Thong; Xu (2012)
38. Vulnerability	Ratchford and Barnhart (2012)
39. Use of computer	Emani et al. (2012)
40. Use forms	Kim and Park (2012)

6 Discussions

The consolidation of the conditioning factors of the diffusion and adoption of technologies made it possible to see that some of them like external pressure of the government, community interest in technology, government policy and social economic characteristics are not part of the internal environment of the adopting organization, but make up its macro environment, surpassing the level of the firm. Cresswell and Sheikh (2013) suggested the study of the environmental influences as a gap in the research on innovations diffusion. Thus, reflecting on the organizational perspective proposed by Bouwman et al. (2005) it is noticed that it is important to consider exogenous factors in coming studies.

The set of conditioning factors of the adoption of technologies reported in this work shows the strength of the Innovation Diffusion Theory (Rogers, 1983), as well as of the studies of Davis (1989) and Venkatesh et al. (2000, 2003, 2012), considering its effect on the great amount of research discussed. It has been found that many studies still test, modify and confirm the findings of these authors. Holden and Karsh (2010), for example, noticed the importance of the theory in generating benefits to the original technology acceptance model (TAM), through its alteration or extension, directing for further research in this way.

The most cited factors still have a strong connection to those proposed by Rogers (1983) – compatibility, complexity, observability, relative advantage and trialability – and the perceived usefulness (Davis, 1989; Venkatesh and Davis, 2000). These refer to factors often considered in studies on technology adoption.

By observing the set of conditioning factors analysed, an interesting proposition for the decision model developed by Rogers (1983) would be to consider the individual alignment of the decision makers and users to the innovation, i.e. to promote a change in attitudes according to the needs of the process and of the technology, as suggested by Ward et al. (2007). The attitudes make up a very important factor cited in several reported studies (Aggelidis; Chatzoglou, 2009, Hung; Tsai; Chuang, 2014, Kim; Park, 2012, Rye; Kimberly, 2007, Rogers, 1983, Ward et al., 2007) and in the proposal presented in the framework (Figure 2), they pervade all stages of the decision making model of Rogers (1983).

It is observed, through the studies of Cresswell and Sheikh (2013), England and Stewart (2007), Hung et al. (2010), Lai, Lin and Tseng (2014), Marsan and Paré (2013) and Rye and Kimberly (2007), the importance of the manager's role in the adoption of technologies. The leaders' views, beliefs, knowledge and expertise have to be focused on innovation and, more than that, a manager has to be able to promote the necessary conditions to the organizational learning, to the climate and to the attitude, adapting them to an enabling environment to the diffusion of innovations and technologies.

In view of the discussion developed so far, this paper proposes, on the following page 16, a framework (Figure 2) to the study of the ICT diffusion in health and hospital services, having as background the process of innovation decision, based on the factors listed before. The factors proposed by Rogers (1983) were kept according to the original model and the others were logically distributed to the most appropriate stages of the process according to the knowledge acquired in the literature.

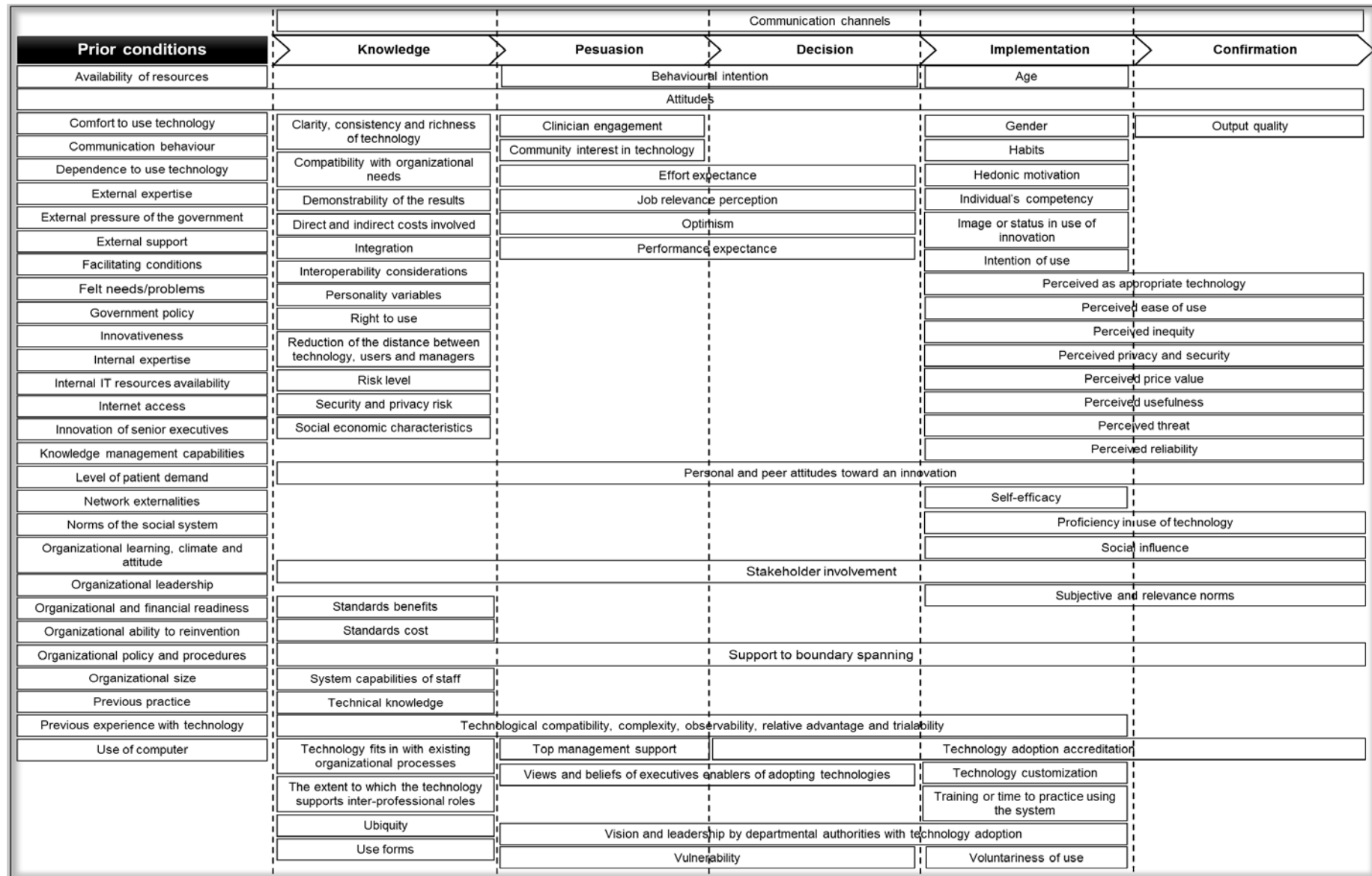


Figure 2. Proposed framework to ICTs diffusion in healthcare and hospital services.

7 Final Considerations

This paper is the result of an effort of readings and reflections focused on the discovery and discussion of existing concepts in research on the facilitating and inhibiting factors of the adoption of Information and Communication Technologies or ICTs in health and hospital services, getting, for it, closer together the Innovation Diffusion Theory and the various conditioning factors of the ICTs adoption.

It is our intent, in a theoretical and investigative work to be developed in the future, to revise, improve and implement the framework proposed here. There are still many questions about the disposition of the factors in the innovation decision-making process, about the existence of new factors to be integrated, and still other considerations that may arise during the development of field investigations from this framework directed at the diffusion of ICTs in health and hospital services.

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Technology Adoption: A review of the Information Systems' approaches, theories and models

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The evolution of studies on acceptance and adoption of technologies is occurring in a fragmented and poorly ordered way, which leaves room for redundancy on variables and on the composition of conceptual models. This study, through the mapping of approaches and critical analysis of its contents, gathered part of the literature production on the subject, creating a common body of knowledge on the proposed models, illustrating points of similarity or conceptual overlaps, major disparities and complementarities. Finally, presents a research agenda proposing the application of variables apparently little applied in the most recent studies of acceptance and adoption of technologies in conceptual models applicable to future studies.

1 Introduction

Studies on information systems have been seeking explanations to questions like how and why individuals accept and adopt new technologies (Venkatesh; Morris; Davis; Davis, 2003). Within this perspective, several theoretical approaches have emerged, aiming to solve the inherent puzzle in this theme.

However, as in any complex phenomenon (social, technological, economic, among others), the acceptance and adoption of technologies have been studied by various theoretical approaches, generating hundreds of variables with their complex relationships of prediction or correlation, in an attempt to explain beliefs, attitudes, and intention to use a certain technology. Thus, the evolution of studies in this area occurs, as expected, in a poorly ordered way, making room for redundancies in the choice and definition of variables and in the composition of conceptual models, and using, moreover, a renaming practice of variables already known and used for decades.

In most of these studies, it is possible to trace a connection with the first approaches on the acceptance and adoption of technologies, such as the Innovation Diffusion Theory (Rogers, 1983), the Theory of Reasoned Action (Fishbein; Ajzen, 1975), the Theory of Planned Behavior (Ajzen, 1991), the Social Cognitive Theory (Bandura, 1986), and, specifically in studies on acceptance and adoption, the Technology Acceptance Model (Davis, 1989; Venkatesh; Davis, 2000) and the Unified Theory of Acceptance and Use of Technology (Venkatesh *et al.*, 2003; Venkatesh; Thong; Xu, 2012).

Thus, we realized the need to catalog, regroup and reorganize variables, and to discuss the composition of constructs on acceptance and adoption of technologies in the 2009-2014 period, in order to identify the main points of similarity, duplicity, disparity, overlaps, and complementarities between the component variables of the different used approaches.

The main objective of the present paper is to identify the theoretical trajectory of studies on the acceptance and adoption of technologies, specifically discussing the main variables that influence or maintain some kind of correlation with the intention to use technologies. It is also an objective to present inputs to the establishment of research agendas on this issue, listing possible gaps related to the arrangement originating from the choice of constituent variables of theoretical models that encourage the development of new research papers on this area.

2 Method

The survey of papers was based on the analysis of published production on five journals of the Senior Scholars' Basket of Journals of the Association for Information Systems (AIS) from January 2009 to May 2014. AIS's Basket indicates eight journals considered to be the best in the IS area and publicly supported by the Association (AIS, 2011). The five journals consulted were: Management Information Systems Quarterly (MISQ), Journal of Strategic Information Systems (JSIS), Journal of Management Information Systems (JMIS), Journal of the Association for Information Systems (JAIS) and Information Systems Journal (ISJ). These journals provided 1100 publications, distributed in the following way: MISQ with 416, JSIS with 196, JMIS with 204, JAIS with 164, and ISJ with 120. In a first selection, we chose to analyze the papers' titles, abstracts and keywords in search of combinations of the following key terms: technology, information technology, information and communication technology, adoption, acceptance, diffusion, readiness, propensity, implementation, purchase, intention and use.

This initial analysis led to the selection of 40 publications on MISQ, 19 on JSIS, 26 on JMIS, 24 on JAIS and 27 on ISJ, totaling 136 papers, i.e. 12% of the total found, to be read and analyzed in a second step, consisting of mapping of the proposed models, and reading, rereading and cataloging their variables. Papers that didn't present models and those describing or explaining phenomena not directly related to the acceptance and adoption of technologies were discarded. At this stage, we discarded 97 publications that didn't have adherence to the theme, corresponding to 71% of the selected papers of the first step, leaving 39 articles whose models and variables were analyzed in the present paper, which added up to 213 constituent variables in the models, approaches and theories studied.

3 Presentation and discussion of theoretical approaches on acceptance and adoption of technologies

The reading of the papers selected for analysis led to the identification of a significant range of variables that comprise theoretical approaches applicable to studies of acceptance and adoption of technologies, whose models are recurrently presented as references to ground researches on the theme. The most widely used model is the Technology Acceptance Model, which, among its versions TAM (Davis, 1989) and TAM 2 (Venkatesh; Davis, 2000), is adopted in 67% of the articles. Next, the Unified Theory of Acceptance and Use of Technology, in its versions UTAUT (Venkatesh *et al.*, 2003) and UTAUT2 (Venkatesh *et al.*, 2012), appears as conceptual model in 26% of the analyzed studies. With lower rates of application, we identified the Innovation Diffusion Theory (IDT) (Rogers, 1983) in 18% of the papers, the Theory of Reasoned Action (TRA) (Fishbein; Ajzen, 1975) also in 18%, the Theory of Planned Behavior (TPB) (Ajzen, 1991) in 15% and the Social Cognitive Theory (SCT) (Bandura, 1986) in 8%. These models and theories represent the approaches considered of reference on the present paper.

We perceived a lower rate of use of more traditional approaches such as IDT, TRA, TPB and SCT in comparison to the more recent TAM and UTAUT. However, we also verified that the more recent approaches, in general, incorporate variables previously established in other models and theories, using different labels. Thus, we assume that classical approaches are considered, even if not directly cited on the papers. We also have to consider the fact that the present paper uses the bibliography for the 2009-2014 period in IS specialized journals, so the appearance of models specific to information technology contexts, such as TAM and UTAUT, is expected.

Other approaches were mentioned, but only once in the 39 studies. Among them are: Elaboration Likelihood Model (ELM) (Petty; Cacioppo, 1981, 1986), Expectation Disconfirmation Theory (EDT) (Oliver, 1977, 1980), Status Quo Bias (SQB) (Samuelson; Zeckhauser, 1988), Institutional Theory (DiMaggio; Powell, 1983), Social Exchange Theory (SET) (Homans, 1958), Contingency Theory (Thompson, 1967), Human-Computer Interaction (HCI) (Card; Moran; Newell, 1983), Structuration Theory (Giddens, 1984), Actor Network Theory (ANT) (Latour, 1987), Technology Threat Avoidance Theory (TTAT) (Liang; Xue, 2009) and Protection Motivation Theory (PMT) (Rogers, 1975). These approaches, due to their low incidence on the studies, were not analyzed in depth by the present review.

3.1 Technology Acceptance Model's (TAM) constructs

The TAM (Davis, 1989) presents variables that help explain the attitude, intention and beliefs of IS acceptance, such as: 1) Perceived Usefulness, defined as “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989, 320); and 2) Perceived Ease of Use, defined as “the degree to which a person believes that using a particular system would be free of effort” (Davis, 1989, 320).

Later, Venkatesh and Davis (2000) extended TAM, formulating TAM2 with the addition of five new predictors of intention to use and actual use of technologies: Subjective Norms, taken from TRA; Image, taken from IDT; Job Relevance, defined as an individual's perception regarding the degree to which the target system is applicable to his or her job; Output Quality, which refers to when people take into consideration how well the system will perform and; Result Demonstrability, also taken from IDT.

TAM, on its first version, is a model composed of few variables when compared to other approaches discussed below. However, it was the most cited model on the papers appreciated in this study, which shows that its smaller number of variables is a good starting point for the discussion of new models.

3.2 The Unified Theory of Acceptance and Use of Technology (UTAUT)

The UTAUT represented a systematic effort to compare and unify the many existing models of technology acceptance. From the theoretical comparison and empirical application of eight models, including IDT, TRA, TPB and TAM, Venkatesh *et al.* (2003) consolidated the referred unified theory, establishing four predictors of the intention to use and usage behavior of technology: 1) Performance Expectancy, defined as “the degree to which an individual believes that using the system will help him or her to attain gains in job performance” (Venkatesh *et al.*, 2003, 447); 2) Effort Expectancy, defined as “the degree of ease associated with the use of the system” (Venkatesh *et al.*, 2003, 450); 3) Social Influence, defined as “the degree to which an individual perceives that important others believe he or she should use the new system” (Venkatesh *et al.*, 2003, 451) and; 4) Facilitating Conditions, which refers to “the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system” (Venkatesh *et al.*, 2003, 453).

Later, Venkatesh *et al.* (2012) extended the theory, formulating UTAUT2 and adding three predictors: 1) Hedonic Motivation, defined as the fun or pleasure the user gets from using a technology (Brown; Venkatesh, 2005); 2) Price Value, defined as consumer's cognitive tradeoff between perceived benefits and monetary costs relative to an application (Dodds; Monroe; Grewal, 1991) and; 3) Habit, defined as the extent to which a user tend to perform behaviors automatically (Limayem; Hirt; Cheung, 2007).

UTAUT, unlike TAM, presents a model with many variables and relationships, possibly because it is an attempt to unify various approaches. It is undeniable that this model explains significantly the technology acceptance

phenomenon, however, it may be important to check in future studies if there is potential risk of saturation due to its large number of parameter and variables.

3.3 Contributions of the Innovation Difusion Theory (IDT)

The IDT was proposed in the 1960s by Rogers (1983) with the objective to organize studies on the diffusion of innovations. This theory proposed five general attributes that influence the adoption of innovations: 1) Relative advantage, defined as “the degree to which an innovation is perceived as being better than the idea it supersedes” (Rogers, 1983, 213); 2) Compatibility, defined as “the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters” (Rogers, 1983, 223); 3) Complexity, defined as “the degree to which an innovation is perceived as relatively difficult to understand and use” (Rogers, 1983, 230); 4) Trialability, defined as “the degree to which an innovation may be experimented with on a limited basis” (Rogers, 1983, 231) and; 5) Observability, defined as “the degree to which the results of an innovation are visible to others” (Rogers, 1983, 232).

Subsequently, Moore and Benbasat (1991) adapted IDT to the IS contexts. Relative Advantage, Compatibility and Trialability were kept. Some variables with different names from those proposed by Rogers (1983) are presented, but have the same definition, and, therefore, we can infer a rename. This is the case of Ease of Use, which uses the same definition of Complexity, and Results Demonstrability, which uses the same definition of Observability. The author also present Voluntariness of Use, which is defined as “the degree to which use of innovation is perceived as being voluntary, or of free will” (Moore; Benbasat, 1991, 195).

Two new variables were proposed: Image, defined as “the degree to which use of an innovation is perceived to enhance one’s image or status in one’s social system” (Moore; Benbasat, 1991, 195) and; Visibility, referring to the degree to which one can see others using the system (Moore; Benbasat, 1991).

IDT is the oldest approach considered on the present study, but its variables are still used in studies on the acceptance and adoption of technologies, even if sometimes they are used under different labels. This is one of the indications of possible redundancies in more recent approaches.

3.4 The Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB) perspectives

The TRA is defined, essentially, by two key variables: Attitude Toward Behavior, which refers to “an individual’s positive or negative feelings (evaluative affect) about performing the target behavior” (Fishbein; Ajzen, 1975, 216), and Subjective Norms, defined as “the person’s perception that most people who are important to him think he should or should not perform the behavior in question” (Fishbein; Ajzen, 1975, 302). TRA was considered with a focus on individual acceptance in the works of Davis (1985) and Davis, Bagozzi and Warshaw (1992).

One of the proponents of TRA proceeded to extend it, thus organizing TPB (Ajzen, 1991), which also sought to explain the intention to use and usage behavior of subjects in a variety of fields. Thus, he added, to TRA, the variable Perceived Behavioral Control, defined as “the perceived ease or difficulty of performing the behavior” (Ajzen, 1991, 188).

The TRA/TPB variables were incorporated into UTAUT and TAM. As in IDT, we see that these variables remained relevant to studies of acceptance and adoption of technologies, indicating possible redundancies and duplicities between recent approaches and those regarded as references on the present paper.

3.5 The approach of the Social Cognitive Theory (SCT)

The SCT was proposed by Bandura (1986), and emphasizes dynamic interactions between people (personal factors), their behavior, and their environments. Compeau and Higgins (1995) and Compeau, Higgins and Huff (1999) applied and extended SCT to the context of computer use. Even though it was used only for computer use studies, the nature of the proposed model allows it to be extended to research the acceptance and use of information technologies in general.

Compeau and Higgins (1995) composed their approach using the variables: Outcome Expectations – Performance, defined as the performance-related consequences of the behavior; Outcome Expectations – Personal, which refers to the personal consequences of the behavior; Self-efficacy, which is the judgment of one’s ability to use a technology to accomplish a particular job or task; Affect, defined as an individual’s liking for a particular behavior and; Anxiety, which means evoking anxious or emotional reactions when it comes to performing a behavior.

It is possible to draw a parallel between TAM and SCT variables. This theory was also used in the elaboration of UTAUT and is, as in the case of IDT and TRA/TPB, still relevant to studies of acceptance and adoption of technologies. SCT was, initially, a general theory to be applied in the research of human behavior, and then went on to be useful in the study of computer use, currently becoming an approach used for the research on technology adoption.

3.6 Constituent variables of theoretical approaches on acceptance and adoption of technologies

Altogether, the five different reference approaches (IDT, SCT, TRA/TPB, TAM/TAM 2 and UTAUT/UTAUT2) define 29 variables as influencing, directly or indirectly, the acceptance and adoption of Technologies. A summary of these variables, in alphabetic order, is shown on the Table 1 below:

Table 1. Constituent variables of theoretical approaches on acceptance and adoption of technologies.

<i>Codes</i>	<i>Constituent Variables</i>	<i>Sources</i>
01	Affect	Compeau and Higgins (1995)
02	Anxiety	Compeau and Higgins (1995)
03	Attitude Toward Behavior	Fishbein and Ajzen (1975), Ajzen (1991)
04	Behavioral Control	Ajzen (1991)
05	Compatibility	Rogers (1983), Moore and Benbasat (1991)
06	Complexity	Rogers (1983)
07	Ease of Use	Moore and Benbasat (1991)
08	Effort Expectancy	Venkatesh <i>et al.</i> (2003)
09	Facilitating Conditions	Venkatesh <i>et al.</i> (2003)
10	Habit	Venkatesh <i>et al.</i> (2012)
11	Hedonic Motivation	Venkatesh <i>et al.</i> (2012)
12	Image	Moore and Benbasat (1991), Venkatesh and Davis (2000)
13	Job Relevance	Venkatesh and Davis (2000)
14	Observability	Rogers (1983)
15	Outcome Expectations – Performance	Compeau and Higgins (1995)
16	Outcome Expectations – Personal	Compeau and Higgins (1995)
17	Output Quality	Venkatesh and Davis (2000)
18	Perceived Ease of Use	Davis (1989)
19	Perceived Usefulness	Davis (1989)
20	Performance Expectancy	Venkatesh <i>et al.</i> (2003)
21	Price Value	Venkatesh <i>et al.</i> (2012)
22	Relative Advantage	Rogers (1983), Moore and Benbasat (1991)
23	Results Demonstrability	Moore and Benbasat (1991), Venkatesh and Davis (2000)
24	Self-Efficacy	Compeau and Higgins (1995)
25	Social Influence	Venkatesh <i>et al.</i> (2003)
26	Subjective Norms	Fishbein and Ajzen (1975), Ajzen (1991), Venkatesh and Davis (2000)
27	Trialability	Rogers (1983), Moore and Benbasat (1991)
28	Visibility	Moore and Benbasat (1991)
29	Voluntariness of Use	Moore and Benbasat (1991)

Source: Authors.

4 General set of constituent variables of theoretical approaches on acceptance and adoption of technologies

From the reading of the analyzed papers, we identified variables complementary to the previous list presented on Table 1. The expanded list, presented in alphabetic order on Table 2, reveals a great quantity of variables that, although they constitute a valuable reference, need to be reorganized in order to fit properly to the operationalization of future studies.

Table 2, below, presents the extended list of variables obtained from the 39 analyzed articles added to the constituent variables from the five reference approaches listed on Table 1 and brought into this extended set (Table 2) highlighted in bold.

Table 2. Extended General Set of constituent variables of theoretical approaches on acceptance and adoption of technologies.

Codes	Constituent Variables	Sources
01	A Priori Attitudes	Sarker and Valacich (2010)
02	Access Facilitation	Datta (2011)
03	Achievement Emotions	Beaudry and Pinsonneault (2010)
04	Activity Support	Junglas, Goel, Abraham and Ives (2013)
05	Actual Usage	Lu, Deng and Wang (2010)
06	Adjusted Beliefs	Sun (2013)
07	Affect	Compeau and Higgins (1995)
08	Affective Quality	Benlian, Titah and Hess (2012)
09	Age	Lu, Deng and Wang (2010), Wattal, Racherla and Mandviwalla (2010), Venkatesh, Sykes and Venkatraman (2014)
10	Agreeableness	Venkatesh, Sykes and Venkatraman (2014)
11	Anxiety	Compeau and Higgins (1995)
12	Appropriations	Al-Natour and Benbasat (2009)
13	Argument Frame	Angst and Agarwal (2009)
14	Assistance	Chan, Thong, Venkatesh, Brown, Hu and Tam (2010)
15	Attitude Toward Behavior	Fishbein and Ajzen (1975), Ajzen (1991)
16	Attitude Toward Outsourcing	Messerschmidt and Hinz (2013)
17	Avoidance of Personal Interaction	Chan, Thong, Venkatesh, Brown, Hu and Tam (2010)
18	Awareness	Chan, Thong, Venkatesh, Brown, Hu and Tam (2010)
19	Behavioral Beliefs	Al-Natour and Benbasat (2009)
20	Behavioral Control	Ajzen (1991)
21	Concern for Information Privacy	Angst and Agarwal (2009)
22	Challenge Emotions	Beaudry and Pinsonneault (2010)
23	Coercive Pressures	Messerschmidt and Hinz (2013)
24	Cognitive Absorption	Cheng (2011)
25	Collectivism	Lowry, Cao and Everard (2011)
26	Comfort with Change	Hong, Thong, Chasalow and Dhillon (2011)
27	Communication Effectiveness	Lu, Deng and Wang (2010)
28	Compatibility	Rogers (1983), Moore and Benbasat (1991), Chan, Thong, Venkatesh, Brown, Hu and Tam (2010)
29	Competitive Pressure	Li, Troutt, Brandyberry and Wang (2011)
30	Complexity	Rogers (1983)
31	Complexity of a Technology	Sarker and Valacich (2010)
32	Compliance	Datta (2011)
33	Computer Self-Efficacy	Brown, Dennis and Venkatesh (2010), Cheng (2011)
34	Concurrency	Brown, Dennis and Venkatesh (2010)
35	Confirmation	Hong, Thong, Chasalow and Dhillon (2011)
36	Conscientiousness	Venkatesh, Sykes and Venkatraman (2014)
37	Consistency with User Knowledge	Hong, Thong, Chasalow and Dhillon (2011)
38	Consumer Review	Benlian, Titah and Hess (2012)
39	Content Quality	Cheng (2011)
40	Context Support	Junglas, Goel, Abraham and Ives (2013)
41	Contextual IT Needs	Walsh (2014)
42	Contractual Restriction	Li (2009)
43	Control	Lowry, Gaskin, Twyman, Hammer and Roberts (2013)
44	Coping Motivation	Herath, Chen, Wang, Banjara, Wilbur and Rao (2014)
45	Convenience	Chan, Thong, Venkatesh, Brown, Hu and Tam (2010)
46	Culture of Innovativeness	Messerschmidt and Hinz (2013)
47	Curiosity	Lowry, Gaskin, Twyman, Hammer and Roberts (2013)
48	Demand Characteristics	Baird, Furukawa and Raghu (2012)
49	Desire for Online Interpersonal Awareness	Lowry, Cao and Everard (2011)
50	Deterrence Emotions	Beaudry and Pinsonneault (2010)
51	Disconfirmation	Venkatesh and Goyal (2010)
52	Discounting Own Information	Sun (2013)
53	Distraction	Guinea, Titah and Léger (2014)
54	Dyadic Object-Based Beliefs	Al-Natour and Benbasat (2009)
55	Ease of Use	Moore and Benbasat (1991)

Table 2 (Continuation). *Extended General Set of constituent variables of theoretical approaches on acceptance and adoption of technologies.*

Codes	Constituent Variables	Sources
56	Economic Facilitation	Datta (2011)
57	Economic Usefulness	Datta (2011)
58	Education Level	Venkatesh, Sykes and Venkatraman (2014)
59	Effort Expectancy	Venkatesh <i>et al.</i> (2003) , Brown, Dennis and Venkatesh (2010), Chan, Thong, Venkatesh, Brown, Hu and Tam (2010)
60	Engagement	Guinea, Titah and Léger (2014)
61	Environment-Based Voluntariness	Wu and Lederer (2009)
62	Evaluative Beliefs	Al-Natour, Benbasat and Cenfetelli (2011)
63	Experience	Hess, McNab and Basoglu (2014)
64	Expertise Disparity	Li (2009)
65	External Coping Mechanism Appraisal	Herath, Chen, Wang, Banjara, Wilbur and Rao (2014)
66	External Influence	Cheng (2011)
67	External Pressure	Wang and Ahmed (2009)
68	Extraversion	Venkatesh, Sykes and Venkatraman (2014)
69	Extrinsic Motivation	Wu and Lu (2013)
70	Facilitating Conditions	Venkatesh <i>et al.</i> (2003) , Sykes, Venkatesh and Gosain (2009), Brown, Dennis and Venkatesh (2010), Chan, Thong, Venkatesh, Brown, Hu and Tam (2010), Datta (2011), Hong, Thong, Chasalow and Dhillon (2011)
71	Familiarity with Communication Partners	Brown, Dennis and Venkatesh (2010)
72	Feedback	Wattal, Racherla and Mandviwalla (2010)
73	Flexibility	Chan, Thong, Venkatesh, Brown, Hu and Tam (2010)
74	Firm Reputation	Kim, Shin and Lee (2009)
75	Frustration	Guinea, Titah and Léger (2014)
76	Gender	Wattal, Racherla and Mandviwalla (2010), Venkatesh, Sykes and Venkatraman (2014)
77	Global IT Needs	Walsh (2014)
78	Group Satisfaction	Sarker and Valacich (2010)
79	Group Taks Performance	Sarker and Valacich (2010)
80	Habit	Venkatesh <i>et al.</i> (2012) , Hong, Thong, Chasalow and Dhillon (2011), Polites and Karahanna (2012)
81	Hedonic Motivation	Venkatesh <i>et al.</i> (2012)
82	Hedonic Systems	Wu and Lu (2013)
83	Herd Behavior	Duan, Gu and Whinston (2009)
84	Identification	Datta (2011)
85	Image	Moore and Benbasat (1991), Venkatesh and Davis (2000)
86	Imitating Others	Sun (2013)
87	Immediacy of Communication	Brown, Dennis and Venkatesh (2010)
88	Immersion	Lowry, Gaskin, Twyman, Hammer and Roberts (2013)
89	Incentive Provision	Li (2009)
90	Income	Venkatesh, Sykes and Venkatraman (2014)
91	Individual IT Culture	Walsh (2014)
92	Individualistic Object-Based Beliefs	Al-Natour and Benbasat (2009)
93	Inertia	Polites and Karahanna (2012)
94	Information Disparity	Li (2009)
95	Information Privacy	Angst and Agarwal (2009), Lowry, Cao and Everard (2011)
96	Informational Cascades	Duan, Gu and Whinston (2009)
97	Informational Rents	Li (2009)
98	Initial Beliefs	Sun (2013)
99	Insight Support	Junglas, Goel, Abraham and Ives (2013)
100	Interaction Quality	Lin and Bhattacharjee (2010)
101	Internal Coping Mechanism Appraisal	Herath, Chen, Wang, Banjara, Wilbur and Rao (2014)
102	Internalization	Datta (2011)
103	Internet Expertise	Li, Troutt, Brandyberry and Wang (2011)
104	Internet Self-Efficacy	Cheng (2011)
105	Interpersonal Influence	Cheng (2011)
106	Intrinsic Motivation	Wu and Lu (2013)

Table 2 (Continuation). *Extended General Set of constituent variables of theoretical approaches on acceptance and adoption of technologies.*

Codes	Constituent Variables	Sources
107	Issue Involvement	Angst and Agarwal (2009)
108	IT Investment	Li (2009)
109	Job Relevance	Venkatesh and Davis (2000)
110	Joy	Lowry, Gaskin, Twyman, Hammer and Roberts (2013)
111	Learning Externalities	Baird, Furukawa and Raghu (2012)
112	Learning Goal Orientation	Cheng (2011)
113	Level in the Hierarchy	Wattal, Racherla and Mandviwalla (2010)
114	Loss Emotions	Beaudry and Pinsonneault (2010)
115	Majority's Opinion	Sarker and Valacich (2010)
116	Manager-Specific Rents	Li (2009)
117	Masculinity	Lowry, Cao and Everard (2011)
118	Memory Load	Guinea, Titah and Léger (2014)
119	Mimetic Pressures	Messerschmidt and Hinz (2013)
120	Modified Beliefs	Sun (2013)
121	Need for Privacy	Messerschmidt and Hinz (2013)
122	Need for Uniqueness	Arbore, Soscia and Bagozzi (2014)
123	Negative Disconfirmation	Sun (2013)
124	Network Centrality	Sykes, Venkatesh and Gosain (2009)
125	Network Density	Sykes, Venkatesh and Gosain (2009)
126	Network Externality	Wattal, Racherla and Mandviwalla (2010), Cheng (2011)
127	Neuroticism	Venkatesh, Sykes and Venkatraman (2014)
128	Normative Pressures	Messerschmidt and Hinz (2013)
129	Object-Based Beliefs	Al-Natour and Benbasat (2009)
130	Observability	Rogers (1983)
131	Observation of Other's Actions	Sun (2013)
132	Online Product Recommendation	Benlian, Titah and Hess (2012)
133	Openness	Venkatesh, Sykes and Venkatraman (2014)
134	Organisational Readiness	Wang and Ahmed (2009)
135	Outcome Expectations – Performance	Compeau and Higgins (1995)
136	Outcome Expectations – Personal	Compeau and Higgins (1995)
137	Output Quality	Venkatesh and Davis (2000)
138	Perceived Decision Process Similarity	Al-Natour, Benbasat and Cenfetelli (2011)
139	Perceived Ease of Use	Davis (1989) , Wu and Lederer (2009), Lu, Deng and Wang (2010), Al-Natour, Benbasat and Cenfetelli (2011), Cheng (2011), Hong, Thong, Chasalow and Dhillon (2011), Li, Troutt, Brandyberry and Wang (2011), Benlian, Titah and Hess (2012), Polites and Karahanna (2012), Lowry, Gaskin, Twyman, Hammer and Roberts (2013), Guinea, Titah and Léger (2014), Herath, Chen, Wang, Banjara, Wilbur and Rao (2014), Hess, McNab and Basoglu (2014), Walsh (2014)
140	Perceived Enjoyment	Qiu and Benbasat (2009), Lin and Bhattacharjee (2010), Lu, Deng and Wang (2010), Al-Natour, Benbasat and Cenfetelli (2011), Cheng (2011), Junglas, Goel, Abraham and Ives (2013)
141	Perceived Network Externalities	Lu, Deng and Wang (2010)
142	Perceived Performance	Cheng (2011)
143	Perceived Personality Similarity	Al-Natour, Benbasat and Cenfetelli (2011)
144	Perceived Service Cost	Lu, Deng and Wang (2010)
145	Perceived Trustworthiness	Al-Natour, Benbasat and Cenfetelli (2011)
146	Perceived Usefulness	Davis (1989) , Qiu and Benbasat (2009), Wu and Lederer (2009), Lu, Deng and Wang (2010), Venkatesh and Goyal (2010), Al-Natour, Benbasat and Cenfetelli (2011), Cheng (2011), Hong, Thong, Chasalow and Dhillon (2011), Benlian, Titah and Hess (2012), Guinea, Titah and Léger (2014), Herath, Chen, Wang, Banjara, Wilbur and Rao (2014), Hess, McNab and Basoglu (2014), Walsh (2014)
147	Perceived Benefits	Wang and Ahmed (2009)

Table 2 (Continuation). Extended General Set of constituent variables of theoretical approaches on acceptance and adoption of technologies.

<i>Codes</i>	<i>Constituent Variables</i>	<i>Sources</i>
148	Performance Expectancy	Venkatesh <i>et al.</i> (2003) , Brown, Dennis and Venkatesh (2010), Chan, Thong, Venkatesh, Brown, Hu and Tam (2010), Datta (2011)
149	Personal (Expert) Power	Sarker and Valacich (2010)
150	Personal Innovativeness	Hong, Thong, Chasalow and Dhillon (2011)
151	Personal Self	Arbore, Soscia and Bagozzi (2014)
152	Personal Innovativeness with IT	Venkatesh, Sykes and Venkatraman (2014)
153	Policy Facilitation	Datta (2011)
154	Position	Walsh (2014)
155	Positional Network	Wattal, Racherla and Mandviwalla (2010)
156	Power Distance	Lowry, Cao and Everard (2011)
157	Pre-Attitude	Angst and Agarwal (2009)
158	Price Value	Venkatesh <i>et al.</i> (2012)
159	Privacy Concern	Herath, Chen, Wang, Banjara, Wilbur and Rao (2014)
160	Provider Recommendation	Benlian, Titah and Hess (2012)
161	Relational Network	Wattal, Racherla and Mandviwalla (2010)
162	Relationship Beliefs	Al-Natour and Benbasat (2009)
163	Relative Advantage	Rogers (1983), Moore and Benbasat (1991) , Li, Troutt, Brandyberry and Wang (2011), Polites and Karahanna (2012)
164	Relative Benefits	Kim, Shin and Lee (2009)
165	Reliability	Hess, McNab and Basoglu (2014)
166	Representation Support	Junglas, Goel, Abraham and Ives (2013)
167	Responsiveness	Herath, Chen, Wang, Banjara, Wilbur and Rao (2014)
168	Resource Scarcity	Messerschmidt and Hinz (2013)
169	Resource Slack	Li, Troutt, Brandyberry and Wang (2011)
170	Results Demonstrability	Moore and Benbasat (1991), Venkatesh and Davis (2000)
171	Risk Propensity	Li, Troutt, Brandyberry and Wang (2011)
172	Satisfaction	Chan, Thong, Venkatesh, Brown, Hu and Tam (2010), Hong, Thong, Chasalow and Dhillon (2011)
173	Search Goods	Benlian, Titah and Hess (2012)
174	Self-Efficacy	Compeau and Higgins (1995) , Chan, Thong, Venkatesh, Brown, Hu and Tam (2010)
175	Self-Identity	Arbore, Soscia and Bagozzi (2014)
176	Service Characteristics	Baird, Furukawa and Raghu (2012)
177	Situational IT Needs	Walsh (2014)
178	Sociability	Junglas, Goel, Abraham and Ives (2013)
179	Social Image	Lin and Bhattacharjee (2010)
180	Social Influence	Venkatesh <i>et al.</i> (2003) , Brown, Dennis and Venkatesh (2010), Chan, Thong, Venkatesh, Brown, Hu and Tam (2010), Datta (2011), Hong, Thong, Chasalow and Dhillon (2011), Arbore, Soscia and Bagozzi (2014)
181	Social Usefulness	Datta (2011)
182	Society Facilitation	Datta (2011)
183	Spatial Network	Wattal, Racherla and Mandviwalla (2010)
184	Stock Ownership	Li (2009)
185	Strategic Orientation	Wang and Ahmed (2009)
186	Strategic Usefulness	Datta (2011)
187	Structural (Legitimate) Power	Sarker and Valacich (2010)
188	Structural Assurances	Kim, Shin and Lee (2009)
189	Subjective Norms	Fishbein and Ajzen (1975), Ajzen (1991), Venkatesh and Davis (2000) , Titah and Barki (2009), Polites and Karahanna (2012)
190	Substantive Conflict	Sarker and Valacich (2010)
191	Sunk Costs	Polites and Karahanna (2012)
192	System Functionality	Cheng (2011)
193	System Interactivity	Cheng (2011)
194	System Response	Cheng (2011)
195	System Use	Sykes, Venkatesh and Gosain (2009)

Table 2 (Continuation). *Extended General Set of constituent variables of theoretical approaches on acceptance and adoption of technologies.*

Codes	Constituent Variables	Sources
196	Task-Technology Fit	Sarker and Valacich (2010)
197	Technical Quality	Lin and Bhattacharjee (2010)
198	Technological Opportunism	Datta (2011)
199	Technological Experience	Brown, Dennis and Venkatesh (2010)
200	Threat Appraisal	Herath, Chen, Wang, Banjara, Wilbur and Rao (2014)
201	Transition Costs	Polites and Karahanna (2012)
202	Trialability	Rogers (1983), Moore and Benbasat (1991)
203	Trust	Kim, Shin and Lee (2009), Chan, Thong, Venkatesh, Brown, Hu and Tam (2010), Messerschmidt and Hinz (2013)
204	Trust Propensity	Kim, Shin and Lee (2009), Qiu and Benbasat (2009)
205	Trusting Beliefs	Benlian, Titah and Hess (2012)
206	Uncertainty Avoidance	Lowry, Cao and Everard (2011)
207	Uncertainty of Technology Adoption	Sun (2013)
208	User Satisfaction	Sun (2013)
209	User's Characteristics	Al-Natour and Benbasat (2009)
210	Valued Network Centrality	Sykes, Venkatesh and Gosain (2009)
211	Valued Network Density	Sykes, Venkatesh and Gosain (2009)
212	Visibility	Moore and Benbasat (1991)
213	Voluntariness of Use	Moore and Benbasat (1991)

Source: Authors.

4.1 Variables related to phenomena different from acceptance and adoption of technologies

In this first analysis, the goal was to eliminate variables that, according to our perception, had poor adherence to the set of relevant variables to the study of acceptance and adoption of technologies because they related better with other phenomena, such as post-adoption, continued use and usage behavior. Thus, in this condition we identified and discarded 16 variables (7,5% of the total), whose codes enable the identification of their labels on Table 2, namely: 05, 12, 15, 24, 35, 51, 64, 72, 82, 120, 123, 165, 172, 183, 195 and 208.

In this task, some variables related to situations of post-adoption were identified, such as: Actual Usage (05), Cognitive Absorption (24), Confirmation (35), Disconfirmation (51), Feedback (72), Satisfaction (172), System Use (195) and User Satisfaction (208). We also discarded variables related to the characterization of systems or organizations which were research locus, such as: Hedonic Systems (82), Power Distance (156), Spatial Network (183) and Stock Ownership (184).

Acceptance and adoption of technologies are intertwined phenomena, since they associate with several other phenomena. Therefore, it is not surprising to find the existence of variables in studies on the subject, but that are not sufficiently adherent to it. These variables may be useful for general purpose studies on human-technology interaction, but in more specific cases, as it is on the present paper, which focus on acceptance and adoption, its relevance to the study of the phenomenon must be tested, thus avoiding a low degree of relevance in the composition of conceptual models to study the phenomenon of acceptance and adoption of technologies.

4.2 Adequacy of variables to different contexts of acceptance and adoption of technologies

Continuing the examination of constituent variables of approaches used in studies on acceptance and adoption of technologies, we attempted to identify their adequacy to different context, be they cultural, geographic or technological, thus having applicability to studies of any technology. In this task, the following variables were identified (the codes presented are the same used on Table 2): 01, 04, 13, 16, 17, 25, 27, 34, 37, 39, 40, 42, 43, 48, 49, 54, 56, 57, 60, 65, 71, 74, 78, 79, 87-89, 92, 97, 99, 100, 101-104, 107, 108, 113, 115, 116, 118, 124, 125, 129, 132, 134, 138, 143, 149, 153-157, 160, 162, 166-169, 173, 176, 178, 182, 184, 185, 187, 190, 192-194, 210 and 211. These totaled 73 variables of limited applicability to specific contexts, the equivalent of 34% of the variables studied.

We perceived, by this analysis, that one third of the variables are adherent to specific determined research locus. Some of the discarded variables in this analysis include Attitude Toward Outsourcing (16), Avoidance of Personal Interaction (17), Communication Effectiveness (27), Content Quality (39), Desire for Online Interpersonal Awareness (49), Level in the Hierarchy (113), Online Product Recommendation (132), Provider Recommendation (160) and Strategic Orientation (185).

The eliminated variables in this analysis are specific to one technology, culture or organization where the research was carried out. Thus, they become useful to study this specific context, but lose power of generalization to studies of any technology, culture or organization, and are, therefore, uninteresting for the present paper.

4.3 Overlap of variables caused by semantic proximity

This section eliminates duplicities that might be caused by the overlap of variables that have semantically close definitions, for example, Complexity of a Technology (Sarker; Valacich, 2010), defined as the degree of difficulty anticipated in using and adapting to a technology, overlapped to Effort Expectancy (Venkatesh *et al.*, 2003), defined as the degree in which use of a technology is expected to be free of effort. This analysis was performed to the variables that were not discarded on previous sections, that is, 124 variables were analyzed for semantic proximity overlap. The codes presented with the variables are the same used on Table 2.

As a first basis of comparison, we used the constituent variables from the approaches considered of reference on the present paper and presented on Table 1. Venkatesh *et al.* (2003), in proposing UTAUT, conducted an analysis of semantic overlap of variables related to various models of acceptance, and the task already performed is valid and applicable to this paper. The categories derived from the work of Venkatesh *et al.* (2003) will be called Categories' Set A. The following variables were identified as overlapping by semantic proximity to Performance Expectancy: Perceived Usefulness, Job Relevance, Relative Advantage and Outcome Expectations. We added the following variables to the categorization of Venkatesh *et al.* (2003): Observability, Output Quality and Results Demonstrability.

In the category Effort Expectancy, Venkatesh *et al.* (2003) identified the following variables: Perceived Ease of Use, Complexity, Ease of Use, Self-Efficacy and Trialability. In the category Social Influence, Venkatesh *et al.* (2003) classified Subjective Norms and Image. Visibility is a variable that possibly could, because of its definition, be seen as belonging to this category. However, when analyzing the evaluation items for this variable as proposed by Moore and Benbasat (1991), we perceived that Visibility does not comprise a social pressure to accept and adopt a technology, as seen in the other variables categorized in Social Influence, thus not allowing to list it in this category.

The last category on Venkatesh *et al.* (2003) is Facilitating Conditions, where Behavioral Control and Compatibility were classified. Four variables were analyzed as non-overlapping to any of the previous categories, forming independent categories: Habit, Hedonic Motivation, Price Value and Voluntariness of Use.

The other variables not belonging to the reference approaches were then rearranged according to the categories resulting from the previous step of overlap by semantic proximity analysis. The results are presented on Table 3 below. The numbering placed next to each variable corresponds to the codes used on Table 2.

Table 3. Set of variables overlapped by semantic proximity.

Categories' Set A (Venkatesh <i>et al.</i> , 2003; Venkatesh <i>et al.</i> , 2012)	Component Variables
Performance Expectancy (148)	Achievement Emotions (03), Behavioral Beliefs (19), Challenge Emotions (22), Compliance (32), Evaluative Beliefs (62), Extrinsic Motivation (69), Flexibility (73), Initial Beliefs (98), Job Relevance (109), Observability (130), Outcome Expectations (135 and 136), Output Quality (137), Perceived Performance (142), Perceived Usefulness (146), Perceived Benefits (147), Relative Advantage (163), Results Demonstrability (170), Strategic Usefulness (186) and Technical Quality (187)
Effort Expectancy (59)	Assistance (14), Complexity (30), Complexity of a Technology (31), Computer Self-Efficacy (33), Convenience (45), Ease of Use (55), Frustration (75), Learning Externalities (111), Learning Goal Orientation (112), Perceived Ease of Use (139), Self-Efficacy (174), Task-Technology Fit (196) and Trialability (202)
Social Influence (180)	Adjusted Beliefs (06), Agreeableness (10), Coercive Pressure (23), Competitive Pressure (29), Consumer Review (38), Discounting Own Information (52), External Influence (66), External Pressure (67), Herd Behavior (83), Identification (84), Image (85), Imitating Others (86), Informational Cascades (96), Interpersonal Influence (105), Mimetic Pressures (119), Network Externality (126), Normative Pressures (128), Observation of other's actions (131), Perceived Network Externalities (141), Relational Network (161), Social Image (179), Social Usefulness (181) and Subjective Norms (189)
Facilitating Conditions (70)	Access Facilitation (02), Behavioral Control (20), Compatibility (28) and Structural Assurances (188)
Habit (80)	Experience (63) and Technology Experience (199)
Hedonic Motivation (81)	Affect (7), Affective Quality (8), Coping Motivation (44), Intrinsic Motivation (106), Joy (110) and Perceived Enjoyment (140)
Price Value (158)	Perceived Service Cost (144), Relative Benefits (164), Sunk Costs (191) and Transition Costs (201)
Voluntariness of Use (213)	Environment-Based Voluntariness (61)

Continuing the work of cataloging, classifying and discussing the variables influencing the acceptance and adoption of technologies, 34 variables that did not fit the Categories' Set A listed on Table 3 remained. Thus, a second group of categories was created to include them, forming the Categories' Set B that can be visualized on Table 4. The categories of the Set B and their definitions are as follows:

- Perceived Risk: the risk perceived by the user as result from uncertainties and potential unwanted outcomes related to the use of the technology (Taylor, 1974);
- Awareness: the degree of knowledge the user has about the technologies available for use (Chan et al., 2010);
- Trust: the belief that the trustee will act cooperatively to fulfill the trustor's expectations without exploiting its vulnerabilities (Pavlou; Fygenson, 2006);
- Personal Innovativeness: Rogers (1983) had already defined Innovativeness as the degree to which the individual is relatively earlier in adopting new ideas than others. We will use a broader definition, considering Personal Innovativeness as the propensity of an individual to use new technologies;
- User's Characteristics (Moderators): the use of moderators has been widely discussed by Venkatesh *et al.* (2003) and Venkatesh *et al.* (2012). Here we consider the User's Characteristics as moderating factors, i.e. affecting the degree of direct influence of variables influencing the acceptance and adoption of technologies.

Table 4 presents the results of this categorization. The codes presented to the variables are the same used on Table 2.

Table 4. Distribution of variables of Categories' Set B considering overlaps by semantic proximity.

Categories' Set B	Component Variables
Perceived Risk	Anxiety (11), Concern For Information Privacy (21), Deterrence Emotions (50), Information Privacy (95), Loss Emotions (114), Need for Privacy (121), Privacy Concern (159), Risk Propensity (171), Threat Appraisal (200), Uncertainty Avoidance (206) and Uncertainty of Technology Adoption (207)
Awareness	Awareness (18), Curiosity (47), Distraction (53), Information Disparity (94) and Technological Opportunism (198)
Trust	Perceived Trustworthiness (145), Trust (203), Trust Propensity (204), Trusting Beliefs (205)
Personal Innovativeness	Comfort with Change (26), Contextual IT Needs (41), Culture of Innovativeness (46), Extraversion (68), Global IT Needs (77), Individual IT Culture (91), Inertia (93), Need for Uniqueness (122), Openness (133), Personal Innovativeness (150), Personal Self (151), Personal Innovativeness with IT (152), Self-Identity (175) and Situational IT Needs (177)
User's Characteristics (Moderators)	Age (09), Education Level (58), Gender (76), Income (90); and, Masculinity (117), Conscientiousness (36) and Neuroticism (127)

In the Perceived Risk category, we inserted variables related to concerns about privacy and personal information, which is understandable when it comes to the adoption of technologies that use the Internet or other mechanisms of information sharing, and possibly is the largest type of perceived risk.

In the Awareness category, we represented the factors that determine the knowledge, by the individual, of the opportunities for technologies available for use. Visibility is a variable that could possibly be categorized in Awareness. However, even though it wasn't classified in Social Influence, it still has points of convergence with other variables in the Social Influence category, and cannot be categorized in Awareness.

The Trust category groups variables based on the reliability perceived by the user in relation to the provider of the technology, and have little semantic variability among its component variables, as shown on Table 4.

Personal Innovativeness gathers variables related to behaviors already presented by the individual regarding the acceptance and adoption of technologies, especially innovative technologies, as a response to the necessities that the individual perceives as demands of technological natures. Therefore, it is a category whose variables show previous behavioral patterns. On variables such as Inertia (Polites; Karahanna, 2012), defined as an attachment to, and persistence of, existing behavioral patterns, we see this pattern as a negative influence to the acceptance and adoption of new technologies by the individual. At the group or organizational level, there are variables such as Culture of Innovativeness (Messerschmidt; Hinz, 2013), defined as existing IT capabilities that influence whether new technologies can be implemented in the existing IT architecture.

Finally, we categorized the User's Characteristics that, adopting the perspective of Venkatesh *et al.* (2003) and Venkatesh *et al.* (2012), may moderate the variables that establish direct influence relations on intention to use and actual use of technologies. Two subdivisions are noticeable in this category, wherein the first one is composed of demographic and social-economic variables (Age, Education Level, Gender and Income), and the second is related to the individual endogenous characteristics, corresponding to the subject's personality and psychological aspects (Conscientiousness, Masculinity and Neuroticism).

4.4 Proposing a research agenda

It is possible to consider that 124 variables analyzed in this paper have strong application potential in the creation of conceptual models to study the acceptance and adoption of technologies. These variables have been rearranged and regrouped into 13 construct categories, after the demonstration of duplicity and derivation in the variables examined in the articles analyzed.

Of the 13 major categories organized in the paper, eight were established from the analysis of five reference theoretical approaches, those previous to the 2009-2014 period. Of the 124 variables whose constitutive definition seems to be more adherent to the application in the composition of conceptual models to study the acceptance and adoption of technologies, 76 (69%) were grouped into the eight reference categories (Categories' Set A). That is, we noticed that a small degree of novelty with respect to the key variables used in more recent studies on acceptance and adoption of technologies, conducted between 2009 and 2014. Considering that two of the five categories that we refer to as the Categories' Set B – User's Characteristics and Personal Innovativeness – may also be partly framed in Categories' Set A (i.e., the five reference approaches), the novelty can be considered even lower.

Considering the categories Perceived Risk, Awareness and Trust, only 17 variables were classified as yet underexplored, which equates to 15% of the 124 variables. This index confirms, again, the small degree of novelty associated to the variables explored in recent studies on the acceptance and adoption of technologies.

From these results, we present some recommendations or issues that can collaborate with future research ideas about acceptance and adoption of technologies. The first suggestion is about the possible need to give more focus to the variables related to Perceived Risk, Awareness and Trust when composing new conceptual models for the development of researches.

A second recommendation would be to conduct empirical efforts aimed at identifying the nature (direct influence, indirect influence, etc.) and the strength of the existing relationships between the many variables available to the researcher, namely: a) Would it be appropriate to seek verification of negative correlation between the variables Perceived Risk and Trust upon adoption of technologies by the user? b) These two variables can influence the relationship between Performance Expectancy and the acceptance and adoption of technologies? c) How is the relationship between the variables Personal Innovativeness, User's Characteristics and Awareness? d) Can Facilitating Conditions be related to Awareness?

Furthermore, it is suggested to evaluate the existence and the type or nature of the relationship between the Visibility variable and other variables such as Awareness and Social Influence to define in which of these two categories the Visibility variable best fit to design future research hypothesis about technology adoption.

In addition to the suggestions of the questions presented above, the small degree of novelty of the variables presented in studies from the 2009-2014 period points to the lack of new constructs on acceptance and adoption of technologies studies. Our epistemological concern is to agree with Serva (2013) that is necessary to stimulate the *knowledge-process* and not the *knowledge-state*. To Ramos (1981, 118 as cited in Serva, 2013, 56): "The contemporary organizational discipline did not develop the analytical skills necessary to criticize their theoretical foundations [...] it sentenced itself to remain pre-analytical".

Other knowledge areas may point the contribution of different constructs. In Marketing, Ratchford and Barnhart (2012) and Parasuraman and Colby (2001), among others, have been already, for some time, studying readiness and propensity to consume technology.

It is also recommended to evaluate the different degrees of influence of variables influencing directly or indirectly the acceptance and adoption of technologies, considering the subjects positioned at different points in the innovation adopters categorization curve presented by Rogers (1983), as shown in Figure .

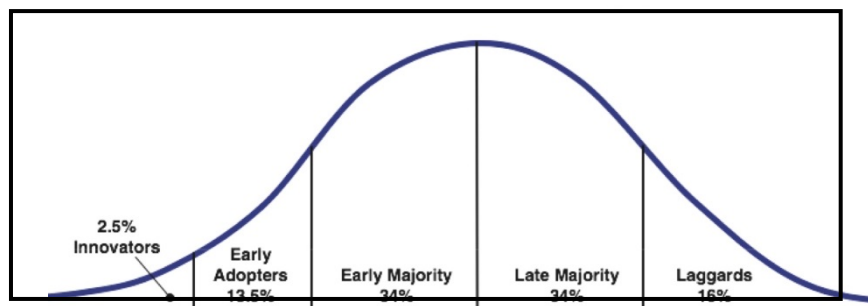


Figure 1. Adopters categorization based on the time in which the individual adopts one or more innovations.

Source: adapted from Rogers (1983, p. 247).

Different groups of individuals in different positions on the curve are, possibly, influenced at different levels and variables, depending on the segment to which they belong. It is pertinent to ask, for example, does Personal Innovativeness have a bigger influence on Innovators than on the Late Majority? Is Price Value more influent to Laggards than it is to Early Adopters?

5 Final considerations

This paper provided an assessment of the constructs adopted in the formulation of models applied to studies on the acceptance and adoption of technologies, considering articles published between 2009 and 2014. A small degree of novelty in the set of variables influencing adoption was noticed, and also that proposed elements in five approaches considered of reference in this paper are still intensively employed in most current studies, configuring multiple conceptual models under different labels or negligible changes in its constituent definitions.

This paper has also showed that some categories can still be considered as more recent variables, with potential to expand their application in future empirical studies aimed at their validation or consolidation. To this end, we provided initial inputs under the form of questions that may serve research agendas that can be developed on the theme in different contexts and technology users segments involving acceptance and adoption.

This paper has a limitation related to the set of journals consulted to survey articles, seen that they are restricted to the information systems area. It is recommended, in future reviews, the use of journal from other areas on the field of Business, such as Marketing, Consumer Behavior, etc., or other fields (Sociology, Economics, Consumer Psychology, etc.) that show interest in studies on acceptance and adoption of technologies, in order to get a clear and comprehensive assessment of the state of the art on this theme.

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Expanding awareness of employees' competences: the holistic perspective

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The phenomenon of employees' competences has received increasing scholarly attention during the last years. However, scholars have not fully identified what individual and organizational-level outcomes there is when identifying the competences from holistic perspective. In our study, we aim to get a deeper understanding of 1) how the construct of competence is defined by employees in case organization and 2) what are the outcomes of identifying these competences at the individual and organizational-level? The study is based on qualitative research data gathered with storytelling and focus group interviews and the data was analyzed by using content analysis method. Based on our study, we argue that a comprehensive competence base enabled the evaluation of their own strengths and weaknesses in their jobs and the evaluation of new development possibilities in workplace. Finally, by applying the holistic competence model, employees had a possibility to obtain more equal work place.

Introduction

The research on employees' competences has received increasing scholarly attention during the last years (e.g., Lai, 2011; Sandberg, 2000; Rychen & Salkaniz, 2003; Cheetham & Chivers, 1998). The need for this research has emerged both from the science and from the practitioners/managers who aim to find new tools and strategies to capture employees' competences into practice. It should be also noted that the ability to successfully implement employees' competences into practice can also operate as a source of competitive advantages for organizations. Thus, the need for this kind of research is evident.

Employees' competences represent dynamic and multifaceted potential for organizational performance but this potential can be adequately mobilized through relevant opportunities, tasks and challenges (e.g., Lai, 2011). Especially employees' "hidden" latent competences should be realized as they can represent a valuable asset to the individual and the firm. These unconscious, "latent" competences can and should be investigated especially from the holistic perspective (Delamare Le Deist & Winterton, 2005; Cheetham & Chivers, 1998) as it goes into "deeper roots" of competence than the traditional competence view (Spencer & Spencer, 1993).

Even though the phenomenon of competence (from the holistic perspective) has received some scholarly attention, scholars have seen it's identification and measurement as difficult. That is, how can scholars identify the real and latent competence capacity, what kind of competences employee's experience and what are the outcomes of identifying these competences (at the individual and organizational level)? It is these research gaps this study aims to fulfill. In more detail, as the measurement of competence from the holistic perspective is still at the early stages of theory development, we employed qualitative research methods (by using storytelling and focused interview as research methods) in order to answer our research questions: 1) *How the construct of competence is defined and understood by employees in our case organization* and 2) *what are the outcomes of identifying these competences at the individual and organizational-level?*

2 Theoretical framework – different levels and views of competence

The phenomenon of employees' competences has been the focus of various studies during the last decades (e.g. Sandberg, 2000; Rychen & Salkaniz, 2003). The concept of competence (see e.g., Delamare Le deist & Winterton, 2005) is very multi-dimensional and difficult to define, identify or impute a coherent theory. One reason is various schools different schools, which define the concept of competence in different way. In more detail, the US focus is clearly on the "inputs", the abilities, aptitudes and talents that a person brings to a job, which enables them to perform satisfactorily or exceptionally. The USA School of competence e emphasizes much more potential rather than demonstrated proficiency. Another fundamental difference between the US and UK approaches in the 1980s and early 1990s was the US search for "excellence" and the exceptional compared to the British systematic identification of the skills needed to perform a role, which can be observed and assessed and therefore trained and developed. This has been described as "the difference between drivers of performance and standards of work. (Roberts 1997, 70). In this study our approach is the school of UK and the term competence. The Table 1. below clarifies some common definitions of competences.

Table 1. Some common definitions of competence found in the literature (Adapted from Woodall & Winstanley 1998 and Horton 2000 in Garavan & McGuire 2001, 150).

<p>Worker-oriented definitions</p> <p>1) The behavioral characteristics of an individual that are causally related to effective and/or superior performance in a job. This means that there is evidence that indicates that possession of the characteristic precedes and leads to effective and/or superior performance on the job (Boyatzis 1982)</p> <p>2) An underlying characteristic of an individual that is casually related to criterion referenced effective and/or superior performance in a job or situation (Spencer & Spencer 1993)</p> <p>3) A High performance or H-competency is relatively stable set of behaviors which produces superior workgroup performance in more complex organizational environments (Schroder 1989)</p>
<p>Work-oriented definitions</p> <p>4) Occupational competence (is) ... the ability to perform the activities within an occupation or function to the level of performance expected in employment (Management Charter Initiative 1990)</p> <p>5) The ability to perform the activities within an occupation (Nordhaug & Grønhaug 1994)</p> <p>6) An action, behavior or outcome which the person should be able to demonstrate (Training Standards Agency 2000)</p>
<p>Multidimensional definitions</p> <p>7) The ability to apply knowledge, understanding, practical and thinking skills to achieve effective performance to the standards required in employment. This includes solving problems and being sufficiently flexible to meet changing demands (NCVQ 1997)</p> <p>8) The skills, knowledge and understanding qualities and attributes, sets of values, beliefs and attitudes which lead to effective managerial performance in a given context, situation or role (Woodall & Winstanley 1998)</p>

Some authors suggest that competencies refer to the collective learning, the diverse production skills and the integration of multiple streams of technologies that exist inside the organization (Prahalad & Hamel 1990). Others refer to firm competencies as the skills of employees that comprise the competency (King & Zeithaml 2001), and that employees must engage in behavior that executes the competency (Leonard-Barton 1992). Competence has been defined as underlying characteristics of people, which are causally related to superior or effective performance in a job (Boyatzis 1982), and as the ability to perform activities within an occupation (Nordhaug & Grønhaug 1994).

In addition, there are separate terminology and approaches between several schools because each of them uses concepts of competence and competency, which have different definitions and the view depends on schools. For example, according to Snyder and Ebeling (1992), competence is a functional sense. Similarly, Gilbert (1996) argues that human competence is a function of worthy performance, which depends on the ratio of valuable accomplishments to costly behavior: Competent people are those who can create valuable results without excessively costly behavior. Competences have been traditionally defined through functional tasks. That is, competences can be seen as the ability to perform tasks so that the end results meet the requirements of a specific task (White, 1994; Robotham & Jubb, 1996; Ramitru & Barnard, 2001). This implies that competences are targeted at specific functions and the specific goals of (the part of) the organization (McDermott, 1998). Some authors have also used the term 'competency' when referring to occupational competence (Boam and Sparrow, 1992; Mitrani et al., 1992; Smith, 1993). Hartle argues that competency as 'a characteristic of an individual that has been shown to drive superior job performance' (1995).

The problematic of using competence as an overarching term is demonstrated by the apparently tautological definition provided by Dooley et al.: 'Competency-based behavioural anchors are defined as performance capabilities needed to demonstrate knowledge, skill and ability (competency) acquisition' (2004: 317). According to this view, competency is a sub-set of itself.

There are few attempts to get the common sense between the terminologies (Tate, 1995; Winterton and Winterton, 1999; Woodruffe, 1991). According to Boak (1991) 'competency' in the American sense complements 'competence' as used in the UK occupational standards. Burgoyne (1988) argues that 'being competent' (meeting the job demands) differs from 'having the competencies' (possessing the necessary attributes to perform competently). Woodruffe (1991) offers the clearest statement, contrasting areas of competence, defined as aspects of the job which an individual can perform, with competency, referring to a person's behaviour underpinning competent performance (Delamare Le Deist & Winterton, 2005.)

Competences have been also investigated from the traditional and holistic competence perspectives. In more detail, traditional view of competence (e.g. Spencer & Spencer, 1993) has viewed it as a construct that is based on individual's knowledge, skills and experience. However, the so called "holistic perspective of competence" (e.g. Delamare Le Deist & Winterton, 2005) views the construct of competence as more dynamic and multidimensional, which includes also employees' personal behavior and ethical values. Overall, the concept of holism refers that "a view that an account of all the parts of a whole and of their interrelations is inadequate as an account of whole" (Mauntner, 1997; in Kelly & Horder, 2001). In addition, the holistic perspective entails also knowledge/cognitive competence (e.g., technical /

theoretical specialist and tacit-practical knowledge) and functional competence (e.g. occupation-specific) which form individual's professional competence (Cheetham & Chivers, 1998). Further, holistic model includes also meta-competencies such as communication, creativity and problem solving (Cheetham & Chivers, 1998). Finally, professional competence (in holistic model) is also shaped by the context of work, work environment and employee's personality and motivation (Cheetham & Chivers, 1998).

Regardless of the researches on holistic competence model, the majority of competence research has offered a relatively rational and positivist perspective which sees that competences are based solely on individuals' characteristics (Arnold & Davey, 1992; Sandberg, 2000; Garavan & McGuire, 2001). Noteworthy, this "rational and positivist perspective" (Sandberg, 2000; Garavan & McGuire, 2001) has ignored the contextual aspects of competences and sees them more as mechanistic and bureaucratic (compared to dynamic and holistic perspective).

Several scholars have also recognized that identifying the real and latent competences have several positive outcomes for individuals and organizations. Overall, employees' competencies are often well understood and implemented in organizations which have adopted the principles of "learning organizations" that support firms constantly to adopt new knowledge and insights through individuals and teams (see Sundberg, 2001). According to Arnold and Mackenzie Davey (1992), people's perceptions of their work-related competencies have great importance in occupational settings. Most importantly, employee work competences are likely to have effect on work performance and perception of training needs (e.g., Arnold & Mackenzie & Davey, 1992), career planning and development (e.g., London & Stumpf, 1982) and communication between the person and other people in the workplace (Carrole & Schneier, 1982).

Lai (2011) has also investigated the role of perceived competence mobilization (=the degree to which employees perceive that they have adequate opportunities to utilize their competences in their current jobs) and its attitudinal outcomes inside organizations. In more detail, Lai (2011) argue that employees' perceived competence mobilization is associated with a number of favorable employee attitudes, including intrinsic motivation, organizational commitment and intention to stay with the organization. Noteworthy, her study included only perceived competence mobilization but did not include "the latent competences" which the individual has.

Morrison et al. (2005) and Parker (2003) have also found that a high level of perceived skill utilization is linked to positive outcomes such as higher job-related affective well-being, higher job satisfaction, lower job-related depression, higher organizational commitment, higher job-related perceived competence and higher job-related feelings of worth. Perceived underemployment, in contrast, reflects a situation in which employees do not feel that they fully utilize their competence based on education and experience (Lai, 2011). Perceived underemployment is related to negative outcomes such as lower psychological well-being, increased job dissatisfaction, lower effective commitment to the organization and higher turnover intention (Erdogan & Bauer, 2009; Feldman, 1996; Feldman & Bolino, 2000; Feldman et al. 2002; Maynard et al., 2006).

It should be noted that employees' perceptions of their work-related competences have great importance in occupational settings as they have implications for career planning and development, analysis of training needs, communication between the person and other people in the workplace and self-ratings of competences are likely to influence a person's work performance (Arnold & Davey, 1992).

3 Context, data and methods

In qualitative studies, it is vital to justify why the researcher has selected a specific context and case and also justify her/his context from a sampling perspective (see Pratt, 2009). The case organization in this study is a development company (Ltd.) operating in social sector in Finland and thus, the social sector in Finland forms also the context of this study. The operation of regional competence centers are based on municipality co-operation. The central focus of the operation is creating co-operation with different actors (municipalities, service producers) relating to social work, research and education. Competence centers in social work area are open networks with light organization model. The operation is based on areal co-operative needs. This ensures flexibility and innovativeness.

The selected case represents a critical case and is an information-oriented selection (not random selection, see Flyvberg, 2006). In more detail, "a critical case can be defined as having strategic importance in relation to general problem" (p. 229) so that "if this is (not) valid for this case, then it applies to all (no) cases" (Flyvberg, 2006, p.229).

As the purpose of this study is to generate new knowledge on this topic, theoretical sampling (see Eisenhardt & Graebner, 2007) was appropriate. Theoretical sampling refers to when "cases are selected because they are particularly suitable for illuminating and extending relationships and logic among constructs" (Eisenhardt & Graebner, 2007: 27).

The research group included 16 participants who worked in the development company in social sector. Table 2. Illustrates the backgrounds of participants of the study.

Table 2. The backgrounds of participants.

Participant no	Age	Male/female	Task
1	40	Male	Development planner
2	33	Male	Development planner
3	51	Female	Development planner
4	34	Female	Development planner
5	40	Female	Network coordinator
6	52	Female	Development planner
7	49	Female	Development manager
8	60	Female	Assistant
9	27	Female	Patient advisor
10	34	Female	Development planner
11	42	Female	Development planner
12	46	Female	Project coordinator
13	45	Female	Development planner
14	46	Female	Financial secretary
15	52	Female	CEO
16	46	Female	Development planner

14 out of 16 interviewees were female whereas only two interviewees were men (see table 2). Interviewees were between the ages of 27 and 60 (most of them being in their 40ties) and nine of out 16 were development planner in their occupation. As most the interviewees' work-related tasks were focused on development planning, it was for these employees to identify their real and latent competence base. When conducting the interviews, each participant wrote the answer to the question "Describe what competencies you have?" and then we used group interviews and presented the holistic competence map (Cheetham & Chivers, 1998).

One form of meaning construction frequently identified in qualitative interview data is story (Mishler 1986). The underlying premise of story inquiry is the belief that individuals make sense of their world most effectively by telling stories (Ricoeur 1981, Smith 1981, White 1981, Connelly & Clandinin 1986, 1990, Sacks 1986, 1992, Riessman 1990, 1991, 1993, Bruner 1991, Clandinin & Connelly 1994, Wiltshire 1995). It is important to note that, for the interpretive researcher, the historical truth of an individuals account (story) of an event is not the primary issue' (Riessman 1993, p. 6

A focus group is a group of individuals selected and assembled by researchers to discuss and utilize their personal experience to comment research topic. As a research technique, the focus group employs guided, interactional discussion as a means of generating "the rich details of complex experiences and the reasoning behind an individual's actions, beliefs, perceptions and attitudes" (Carey, 1995). This information can be used to identify potential areas of inquiry or to clarify subject matter that, by its nature, eludes other research instruments. The "focus" underpinning the discussions is anything that engages the focus group in a collective activity, "such as viewing a film, examining a single health education message or simply debating a particular set of questions" (Kitzinger, 1994). According to Powell and Single (1996), a focus group is especially useful when 1) existing knowledge of a subject is inadequate and elaboration of pertinent issues or the generation of new hypotheses is necessary before a relevant and valid questionnaire can be constructed or an existing one enhanced, 2) the subject under investigation is complex and concurrent use of additional data collection methods is required to ensure validity or 3) the subject under investigation is complex and comprises a number of variables. A focus group enables the researcher to concentrate time and resources on the study's most pertinent variables.

In analyzing the story telling papers and focus group interviews, we used content analysis, which is both the analysis method and thematic method. We studied the storytelling papers and transcribed interviews mainly inductively (Pratt, 2009) without guiding theory structure or a structure of pre-selected rating (Silverman, 1989) and identified. Spencer, Ritchie, and O'Connor (2003) have described the iterative process throughout analysis. The first level (data management) generates themes and concepts and the purpose is to label or tag data. According to Braun & Clarke (2005), what counts as a theme is not (usually) dependent on quantifiable measures but instead, it depends on whether the potential theme captures something relevant to the investigated research question (Braun and Clarke, 2006). Researchers classified and sorted the data at the second level (descriptive accounts) in order to ascertain their meaning. The third level (explanatory accounts) addresses how and why questions and establishes the typologies.

The current study followed the above mentioned iterative process. First, we coded and identified themes and concepts before classifying and sorting themes and issues, and then establishing head typologies. Finally, we addressed the research questions on the basis of the research data gathered.

4 Findings

The findings from the first part of the study (16 employee stories) revealed that each participant experienced their competence individually and differently. In general, the participants understood the concept of competence much narrower than what the Cheetham & Chivers (1998) have presented. For example, one interviewee stated following: *“it helps to perform all tasks when you understand the diversity of your competences. And the workplace as well.”*

When comparing the answers with the category of competences by Cheetham & Chivers (1998), we identified that some of the participants experienced that their competences have only two aspects: cognitive and personal competence (see Spencer & Spencer, 1998). For example, one interviewee suggested that *“I have good ADP skills and then I’m a good listener and I have good interpersonal skills.”* However, only a view used the whole scale of competence model when evaluating their competences (see table 2 for quotes).

Noteworthy, no one mentioned professional behavior, obeying the law or the work-related ethics when evaluating their competences. For example, no one mentioned the concealment of confidential information in their story – even though it is closely related to the field of operation in the study. However, several participants described only substance competence (“hard competence”) or competences that relate to their own behavior or their values (“soft competences”) (see Woodall and Winstanley, 1998). Following quotes describe well this: *“I have a good substance competence”; “I get along with all kinds of people and I can encourage people.”*

Several participants described their competences only as meta competences, like communication skills and social interaction, creativity, innovativeness, problem-solving skills and the ability to perceive big entities. For example, one participant described following: *“I’m good to create the networks, I’m very flexibility and I can tolerate the stress.”*

Some of the participants described their cognitive and functional competence in that way that meta competence was intertwined with the evaluation of their competences. For example, describing competences could be that they manage their every-day-life routines well and they can apply problem-solving skills and flexibility (see table 2 for quotes).

Further, their presumption was that their so called “substance competence” is automatic, built-in operation which they cannot even think in every-day-life operation (see also Sandberg, 2000). Employees experienced that their comprehensive competence base manifested in that their sub-conscious directs their operation and uses different ways to operate in different situations – without the employee even realizes it (Lai, 2011). In addition, employees constructed different meanings of competences; they were considered as “real” as they matched the individual’s perceptions of the operation related to the context (Wierdsma, 2007).

So called “super meta competence” which manifests as the “ability to reflect” manifested in several stories: employees identified critically and analytically their own deficiencies but also the talents and gifts and they could evaluate their own operation from the perspective of others (see table 2 for quotes.)

Interviewees also suggested that change and the tolerance of change demanded skills such as the ability to change their thinking and operation methods, flexibility and open mind. All of the employees experienced change as positive which operates as a precondition and a “driver” of operation and development. In addition, change made it possible for them to use their creativity, because through change, they were able to recognize aspects that require changes, alternative operation methods and models in their work. High tolerance of change strengthened also the tolerance of insecurity and complexity (Lai, 2011). In addition, high tolerance of change also helped them to adjust to their presence (see table 2 for quotes).

Change also enabled the development of their work to various different directions (within the strategy of their company). Through change, participants experienced that they could grab to new tasks and when the opportunity arises, they could move from their “comfortable zone” voluntarily. Change enabled watching new situations and it created a feeling that things proceed and development is happening, and then they could ignore their “old and safe ways/habits” (Lai, 2011).

Employees also highlighted their networking-related competences in that it helped them develop new innovations and service entities and it also enabled to take into account the customer’s perspective. For example, one interviewee stated that: *“I’m a director of many networks and I feel, that I’m conversational and give space to others. Such action requires that I have to be good for summarizing all discussions and conclusions.”*

Networking was seen as a precondition for own learning when the job description was unique and when they did not have colleagues with whom they could discuss with their work-related issues and problems and development areas related to their work. In this way, network offered a natural support and a route to development (see Morrison et al., 2005). In addition, operating in a network brought up their own competence and especially their ability to reflex their own operation. Networks were also seen as a possibility to learn how to create networks, how to manage them and they experienced networks as a good way of “making things clear” and an arena of managing their competences (see table 2 for quotes.)

Ability to network was seen as a living condition and as something that maintains their job satisfaction. For example, many of the employees have stated their jobs by building networks (Parker, 2003)

Several participants started description of their competences by describing their families and hobbies. This was also related to value- and ethical competences which told much about the personal values of the employee. In more detail, these were the most valued factors that came before their work: *“Outside of work I’m an older sister, mother for three children (one of them is hearing-impaired) and I live in such a “new family”. So I have my own family and in addition my husband’s children and family.”*

For example, employees identified competences related to their hobbies (for example in the sport association) or their tasks in similar associations (for example, as a trainer). Personal hobbies such as playing instruments, singing, gardening, out-door activities, moving in the nature, boating, diving, skiing and taking care of their pets were mentioned in the employees' stories. Family-life was also seen closely related to their competences and especially women described it through their role as a mother: what it required and demanded, what kind of results they were able to achieve by being mothers and how they could implement their role as a mother to their work. Following quote describes this theme: *"I'm a wife. I have received a good present – the gift to love. I'm a mother to two children. I have had possibility to learn to be mother with my children."*

Employees roles as a mother and a partner was strongly seen as a nurse, ability to control their emotions, ability to understand different generations, taking care of the daily routines and for challenges which single mums experienced. In addition, employees also highlighted their competences related to their relationship with their spouses and interaction with their relatives and friends (Dooley et al., 2004). Age and life experience from work life was seen as a huge strength which enabled them to receive also demanding job-related tasks and to constantly develop their skills and competences.

In several employee stories, competence was seen as a synonym for "being good in something" or they needed improvement in some other aspect – or they had succeeded in something.

The Table 3 illustrates the example of arranged themes based on the findings.

Table 3. Example of arranged themes.

Example from the text	Code	Theme
<p>"Also have good organizing skills."</p> <p>"Addition, I have good ADP skills."</p> <p>"I can do several things with the computer: memorandums, power point presentations, reports, tables, diagrams.."</p>	Formal knowledge base of profession, basic routines -how, what, who, when etc., range of profession specific functions and tasks, planning, monitoring, implementing, IT skills	Substance based approach
<p>"I can think big entities and analyze and combine my experience, operational environment, information from outside etc. And to combine people and things.."</p> <p>"I have noticed that my strength is the ability to picture large entities and to combine things together, the way things are related to each other.."</p>	Creativity, problem solving, learning/self-development, mental agility, analysis, reflection	Meta competences oriented
<p>"In the working life I like changes, when they are justified in a somehow reasonable way.."</p> <p>"In my own work, changes keep me cheerful and they challenge me in a nice way to develop own professional competence."</p>	Tolerance of chance, network capability	Chance and network capability as competence drivers
<p>"I am actively involved in the operation of two sport associations"</p> <p>"I am a single mum of two teen age boys, in which I have succeeded in quite well.."</p>	Family, hobbies, leisure activities	Private life oriented and competence perspective
<p>"In the inter-personal relationships I am the conciliator and the listener."</p> <p>"As a manager of the networks I am discussing and I give room for others."</p>	Self confidence, control of emotions and stress, listening skills, task centeredness, empathy, values, ethical competences	Unknown personal/behavioral competences

In the second phase of the study, we presented the holistic competence model by Cheetham & Chivers (1998) and each part of the model was discussed carefully with the participants. Based on this holistic competence model, the employees realized their competence base much more comprehensively as what they had previously thought of themselves: *"I think this is good in that it somehow this domination of cognitive competence becomes more equal with other aspects of the competence."*

Realizing this produced an explanation for why the work atmosphere in the organization was perceived as positive and something that supported everyone. In addition, learning was enabled through colleagues. Several employees also understood the meaning of their attitude that relates to their personal competence; even though the substance competence would be fine, it would anyway disappear if the attitude was not right. Identifying employees' competences

comprehensively was perceived as something that unites and encourages in change and in the inner organizational dynamics (see Erdogan & Bauer, 2009; Feldman, 1996; Maynard, 2006).

"It eases at least the coping when you understand the complexity of competences and in a way it kind of helps to understand work place, I mean like the way employees have focused their competences differently." "... then the attitude, if you take an attitude like I can" "I think this is like a richness that everyone sees it differently and we don't label employees as better or worse.."

"If you identify the different competence levels, then if we organize teams then we can put right assembling"

In summary of the participants had not identified and recognized their own competences according to the holistic competence model by Cheetham & Chivers (1998).

"These are things which I have taken as granted, these are something which are always present...I had insights when you see these things written down"

In addition, several participants experienced that it made them "easier to work" as they had identified their whole comprehensive base, because then they realized that if they would fail, they would still have several other competence aspects where they would be strong. Comprehensive competence base enabled the evaluation of their own strengths and weaknesses and it enabled them to evaluate new development possibilities. In addition, participants felt it was richness to recognize that every employee in the company looks at things differently, depending on their level of competence (development level). By recognizing this, the focus group expressed that by using the holistic competence model, they are able to achieve more equal working place. This finding also pushes the previous knowledge of the outcomes of using holistic competence model in the workplace to the edges of new scientific knowledge. That is, to our knowledge, this finding has not been highlighted in the previous studies of holistic competence model (see Cheetham & Chivers, 1998).

In addition, the holistic competence model gave tools for self-management, which reflected also to the inner dynamics inside their organization:

"I somehow thought of the recruiting situation, that in that situation we could actually apply this model and on the other hand, the development discussions and then to apply for self-management and for evaluating own core competences."

We also notified that the participants highlighted competences related to their personality and to their ethical operation: attitude towards the work, customers, colleagues, empathy, personal behavior, giving feedback to colleagues and behaving ethically. The identification of holistic competence model helped them to tolerate more differences, being helpful, equal, creating "we-spirit" and understanding the meaning of inter-personal skills (see Cheetham & Chivers, 1998; Sundberg, 2001).

5 Discussion and conclusions

The object of this study was to get a deeper understanding of what individual and organizational-level outcomes there is when identifying the competences from holistic perspective. It is shown in various scientific research that scholars have seen the identification of competences as difficult. In addition there exists also a research gap concerning how the holistic perspective can and should be best applied in order to harness employees' real and latent competences into practice. The study answered to the research questions: "how the construct of competence is defined and understood by employees' in case organization and 2) what are the outcomes of identifying these competences at the individual and organizational level?

Based on our study, we argue that the employees in our case company defined and understood the competence mainly as the traditional competence view focused on cognitive and functional competences (e.g., Spencer & Spencer, 1993). However, the holistic competence approach (e.g., Cheetham & Chivers, 1998) provided a significant insight to employees understanding of their very broad competences and an in-depth understanding of their own work. The findings of our study has several theoretical insights (see Corley & Gioia, 2011) that push forward the current knowledge on how holistic competence approach can be applied in order to harness employees' competences into practice. In addition, we found that utilizing holistic competence approach in order to map out employees' competences has several individual and organizational-level outcomes this has.

That is we found that identifying these competences had several positive outcomes both to the individuals (employees) and to the case organization and can lead to effective and/or superior performance on the job (Boyatzis, 1982). At the individual level, understanding the holistic competence view made it easier to own reflection and understanding behavior and actions of other employees, the importance of empathy and capability to control of own emotions. Training Standard Agency (2000) mention, that identifying individuals own competences it leads to an action, behavior or outcome which the person should be able to demonstrate.

In summary, the holistic perspective increased employee's well-being in organization. As Woodall and Winstanley (1998) has argued multidimensional approach includes the skills, knowledge and understanding qualities and attributes, sets of values, beliefs and attitudes which lead to effective managerial performance in a given context, situation or role. Secondly, employees experienced a new kind of job satisfaction as they found that they own a lot more competences and that part of these competences are "latent" as they had been hidden and unconscious. At the organizational level, identifying employees' competences was also important and had positive outcomes. employees' competencies are often well understood and implemented in organizations which have adopted the principles of "learning organizations" that

support firms constantly to adopt new knowledge and insights through individuals and teams (see Sundberg, 2001). Finally, we argue that the concept of holistic competence view helped in self-assessment, reflection and attitude editing both to the individual and organizational level.

The first contribution of this study is to emphasize the value of understanding the holistic competence approach. For example it is useful in recruiting process and development discussion when identifying employees' features and hidden talents. The topic has been less studied, and its thematic has not experienced significant or even fitted the business related decision making. From managerial aspect one benefit is the new way of understanding the tacit dimension in work place atmosphere and group dynamics. Secondly, the research enables the development of recruiting and development discussion processes, if it is possible to create, for example, the question tools which help to evaluate the intangible and abstract issues from holistic competence perspective. Thirdly, the study underlines the importance of creating an assessment tool for recruitment process targeting to evaluation of holistic competence approach and intangible and abstract issues.

Limitations

This study is a qualitative case study and only one case organization was examined. Therefore, the results cannot be generalized in a larger extend. However, information was gathered from 16 employees and there were two methods: storytelling and focus group interviews. In the future it might be interesting to repeat the study with personnel in different context.

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Les nouvelles pratiques dans le commerce de détail alimentaire peuvent-elles permettre des économies d'énergie?

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Dans le contexte actuel de la transition énergétique et notamment d'un renforcement des réglementations énergétiques, le secteur du commerce de détail alimentaire s'intéresse de plus en plus à la question de la maîtrise de ses consommations d'énergie. Un certain nombre d'innovations technologiques sont mises en œuvre (adoptées), par exemple la mise en place de systèmes de ventilation innovants ou la fermeture des meubles réfrigérés. Mais d'autres changements en cours dans le secteur sont également susceptibles d'influencer fortement le montant des consommations d'énergie. Ces innovations de services ou organisationnelles sont plus rarement prises en compte dans les réflexions quant à l'évolution des consommations d'énergie. Ce sont ces innovations et leurs répercussions énergétiques que nous cherchons à identifier dans le cadre de ce papier.

1 Introduction

La question de la maîtrise de la demande d'énergie dans le secteur du commerce de détail alimentaire se limite souvent à l'analyse des innovations technologiques capables de réduire les consommations d'énergie. Ce biais *technologiste* n'est pas spécifique au secteur du commerce et concerne plus largement l'ensemble des activités de services.

Un parallèle peut-être fait entre cette vision de la maîtrise de la demande d'énergie et celle de la question des innovations, en général, dans les services : longtemps, l'étude des innovations dans les services s'est limitée à l'adoption par les services d'innovations technologiques produites dans le secteur industriel (Barras, 1986 ; Miozzo et Soette, 2001). C'est la perspective *technologiste*, selon la terminologie introduite par Gallouj et Savona (2009). Par la suite, un certain nombre de travaux ont porté sur les innovations purement non technologiques, notamment dans les services intensifs en connaissance (Desai et Low, 1987 ; Gallouj, 1991 ; Miles, 2007). Ils relèvent de l'approche *servicielle*, selon la terminologie introduite par Gallouj et Savona (2009). Plus récemment, constatant que la frontière entre les biens et les services est de plus en plus floue (de nombreux services ont une composante matérielle importante et de nombreux biens ont une composante servicielle importante), il est apparu des travaux dits d'une approche *intégratrice* (Gallouj et Weinstein, 1997 ; DeVries, 2006 ; Windrum et Garcia-Goni, 2008).

Notre hypothèse est la suivante : dans le domaine de la maîtrise de la demande d'énergie, il est important d'élargir l'analyse des innovations capables d'influencer les consommations d'énergie aux innovations non technologiques. D'autres formes d'innovation (des innovations de services) sont susceptibles d'influencer fortement la demande d'énergie dans le secteur du commerce. Dans cet article, nous étudions donc l'articulation entre les problématiques de l'innovation et de l'énergie dans le secteur du commerce de détail alimentaire. Nous ne nous limitons pas aux innovations mises en œuvre dans le but de réduire les consommations d'énergie. Nous souhaitons aller au delà, en déterminant les répercussions énergétiques des innovations mises en œuvre pour répondre aux grands enjeux du secteur.

Pour répondre à ces questions, nous proposons un modèle d'analyse théorique, pour l'ensemble des services. Ce dernier repose sur une adaptation de la représentation du produit (biens ou services) en termes de caractéristiques, dans le prolongement des travaux de Gallouj et Weinstein (1997), qui met en évidence les relations entre l'innovation dans les services et l'évolution des consommations d'énergie. Sur cette base, nous identifions différents axes d'innovation dans les services, du point de vue de leurs répercussions sur les consommations d'énergie. Nous appliquons ensuite ce modèle théorique à l'analyse du secteur du commerce de détail alimentaire. Nous avons mené une série d'entretiens semi-directifs auprès de dirigeants des principaux groupes du commerce de détail en France et des associations et fédérations qui les soutiennent. Nous avons également rencontré des directeurs de magasin, et recueilli auprès d'eux des informations précises sur les consommations d'énergie, au niveau d'un établissement et sur mesures d'économie d'énergie mise en œuvre. Notre troisième groupe d'interlocuteurs est constitué de professionnels de la logistique du commerce alimentaire, la logistique étant une composante essentielle de l'activité de commerce, très active sur les questions d'énergie. Le contenu des grilles d'entretien a été adapté à chaque type d'interlocuteurs, mais, d'une façon générale, les questions ont porté sur les consommations d'énergie de l'activité commerciale (les principaux postes, les enjeux énergétiques, etc.), sur les dynamiques du secteur et sur leurs répercussions énergétiques. Au total, nous avons rencontré 13 personnes. Pour rendre compte du contenu des entretiens (tous enregistrés et retranscrits), nous avons utilisé la méthode d'analyse thématique¹²⁴.

Dans une première section, nous présentons donc notre modèle théorique pour l'analyse des dynamiques d'innovation dans les services et de leurs répercussions énergétiques. Ce modèle rend compte de la diversité des dynamiques d'innovation pouvant influencer les consommations d'énergie, au delà des mesures de maîtrise de la

¹²⁴ La liste des personnes rencontrées, la grille d'entretien, ainsi que la grille d'analyse thématique sont présentées en détail dans Fourcroy (2013).

demande d'énergie. Dans une seconde section, nous appliquons ce cadre d'analyse au secteur du commerce de détail alimentaire pour identifier les dynamiques d'innovation à l'œuvre qui ont des répercussions importantes sur les consommations d'énergie, à la hausse ou à la baisse.

2 Un modèle d'analyse des dynamiques d'innovation dans les services et de leurs répercussions énergétiques

2.1 Une représentation des services, adaptée à l'analyse de leur demande d'énergie

Gallouj et Weinstein (1997) s'appuient sur les travaux de Lancaster (1966) et de Saviotti et Metcalfe (1984) pour proposer une définition du produit (un bien ou un service) en termes de caractéristiques (figure 1). Un produit peut être représenté par la combinaison de différents vecteurs de caractéristiques : un vecteur des caractéristiques de service, un vecteur des caractéristiques techniques et deux vecteurs des compétences, des prestataires et des clients. Le vecteur des caractéristiques de service est composé de caractéristiques qui justifient le recours au service, mais aussi de caractéristiques complémentaires qui améliorent les performances des précédentes et d'externalités. Les compétences sont incorporées à l'individu, à un groupe d'individus ou encore à une organisation. Elles sont le fruit de sa formation, de son expérience, de ses interactions, etc. Elles sont, le plus souvent tacites, et difficilement transmissibles. D'ordre scientifique, technique, opérationnel ou relationnel, elles sont mobilisées pour utiliser les techniques ou directement pour réaliser le service. La prestation de services nécessite non seulement la mobilisation de compétences de la part du prestataire, mais également de la part du client, qui coproduit généralement le service. La coproduction qui est une caractéristique importante du service peut, ainsi, être représentée par l'articulation de ces deux vecteurs de compétences. Le vecteur des caractéristiques techniques est défini comme l'ensemble des techniques utilisées pour réaliser le produit. Ces techniques peuvent être tangibles (du matériel informatique, de logistique, ou de coiffure, par exemple) ou intangibles (un instrument mathématique, une méthode de travail, etc.). Elles sont codifiées, transmissibles et indépendantes des individus. Dans le modèle initial, seules les techniques du prestataire sont prises en compte. Par la suite, les techniques du client ont été ajoutées (DeVries, 2006 ; Gallouj et Savona, 2010) : avec le développement des technologies de l'information et de la communication, l'interface client/prestataire fait de plus en plus souvent intervenir les technologies du client.

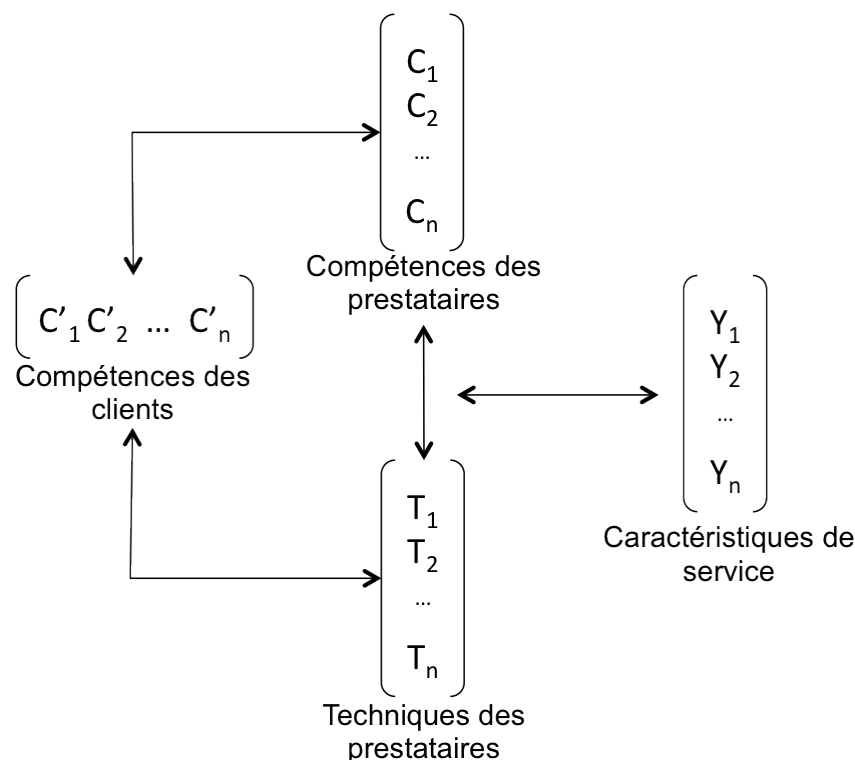


Figure 4. La représentation générale des biens et services selon Gallouj et Weinstein (1997).

Ce modèle est utile et adapté (sous réserve de quelques amendements) à l'étude des consommations d'énergie des services. Le mécanisme de formation de la demande d'énergie est récapitulée dans la figure 2. La réalisation du service (du *besoin de services*) suscite un *besoin de services de l'énergie* (c'est-à-dire d'énergie *utile*) : un travail, un mouvement, un élévation de température, etc. Ce dernier dépend d'un certain nombre de facteurs exogènes, comme le

climat extérieur ou les apports internes et gratuits de chaleur¹²⁵. Les consommations d'énergie réelles, nécessaires pour satisfaire ce besoin d'*énergie utile* sont, ensuite, fonction des caractéristiques techniques des équipements utilisés, ainsi que de la façon dont ces équipements sont utilisés. Ainsi, les éléments à l'origine de la demande d'énergie apparaissent de façon plus ou moins explicite dans le modèle : les équipements, les comportements d'utilisation, le niveau de service demandé, etc. Les consommations d'énergie peuvent, elles-mêmes, être formulées en termes de caractéristiques de services (caractéristiques complémentaires ou externalités).

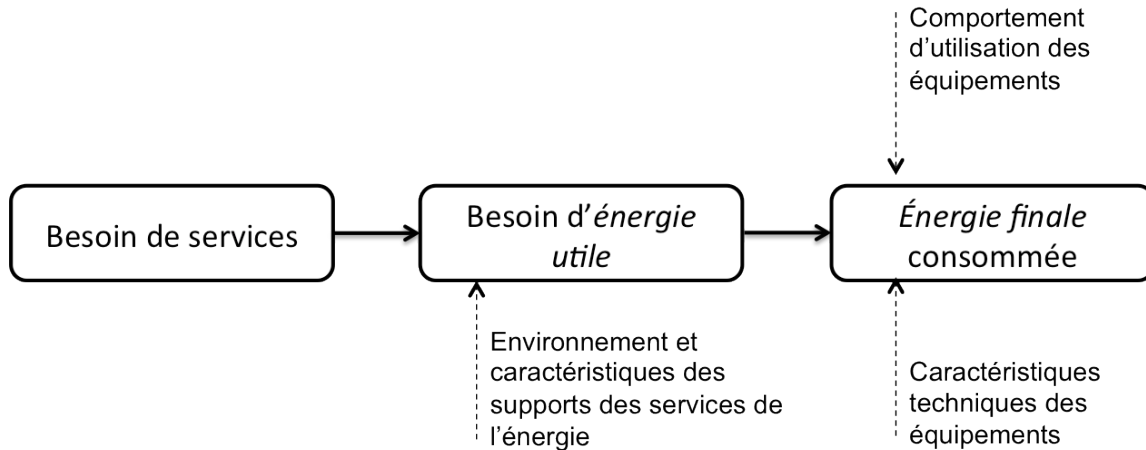


Figure 5. Le mécanisme général de formation de la demande d'énergie.

Nous proposons également plusieurs amendements à la représentation initiale, pour l'adapter à notre étude. Ces modifications concernent les techniques, les compétences et le périmètre du service.

2.1.1 Modifications des vecteurs des caractéristiques techniques

Dans la représentation du produit en termes de caractéristiques, le vecteur des caractéristiques techniques est parfois appelé le vecteur des techniques, ce qui traduit une ambiguïté entre les artefacts techniques individuels (les techniques) et leurs composants internes (les caractéristiques techniques). Or, les services ne sont pas incorporés dans des composants techniques dont ils seraient indissociables. En revanche, ils peuvent mobiliser des outillages techniques. Il faudrait donc envisager un vecteur des techniques à deux dimensions : celles des techniques mobilisées (c'est-à-dire les outils techniques non incorporés) et celle des caractéristiques techniques internes (c'est-à-dire les composants techniques internes) de chacune de ces techniques. Pour simplifier cependant, dans la suite de ce chapitre, nous ne faisons généralement mention que d'une seule dimension. On définira ainsi le vecteur des techniques comme l'ensemble des *outils techniques* mis en œuvre pour fournir le service.

Le terme de *techniques* regroupe les techniques tangibles et les techniques intangibles. Les techniques tangibles correspondent notamment à l'ensemble des équipements du service. Certaines de ces techniques tangibles sont consommatrices d'énergie (T_e). D'autres ne consomment pas directement d'énergie, mais influencent le besoin d'*énergie utile*. Elles correspondent principalement à des techniques renvoyant aux bâtiments (T_b). Les techniques intangibles correspondent, pour leur part, aux routines et méthodes de travail. Certaines techniques intangibles ont une influence directe sur les consommations d'énergie : les méthodes d'utilisation des techniques (M_e).

2.1.2 Modifications des vecteurs des compétences

Nous proposons également d'élargir le sens des *compétences*. En effet, les caractéristiques de services ne sont pas simplement le résultat de la mobilisation conjointe des compétences et des techniques. Il existe une abondante littérature sur l'influence des comportements humains sur la demande d'énergie (Wilson et Dowlatabadi, 2007 ; Lutzenhiser, 1993 ; Van Raaij et Verhallen, 1983). Cette littérature converge vers l'idée que le comportement dépend non seulement des compétences au sens strict, mais aussi des compétences au sens large (c'est-à-dire des valeurs, des croyances, des normes, des habitudes) et des conditions extérieures.

Dans le vecteur *compétences*, nous proposons donc d'intégrer l'ensemble des *caractéristiques* des individus dont dépend leur comportement¹²⁶. Comme dans la représentation de Gallouj et Weinstein (1997), ces caractéristiques sont le résultat des expériences, formations et autres interactions des individus. Elles sont, le plus souvent, tacites et difficiles à transmettre.

¹²⁵ Les apports internes de chaleur correspondent à l'apport de chaleur par les occupants ou les équipements. Les apports gratuits correspondent à l'ensoleillement.

¹²⁶ Il est, bien sûr, entendu que le comportement ne dépend pas uniquement de ces caractéristiques, mais notamment aussi des méthodes ou routines dont dispose l'individu et qui sont, pour leur part, décrites dans le vecteur des techniques.

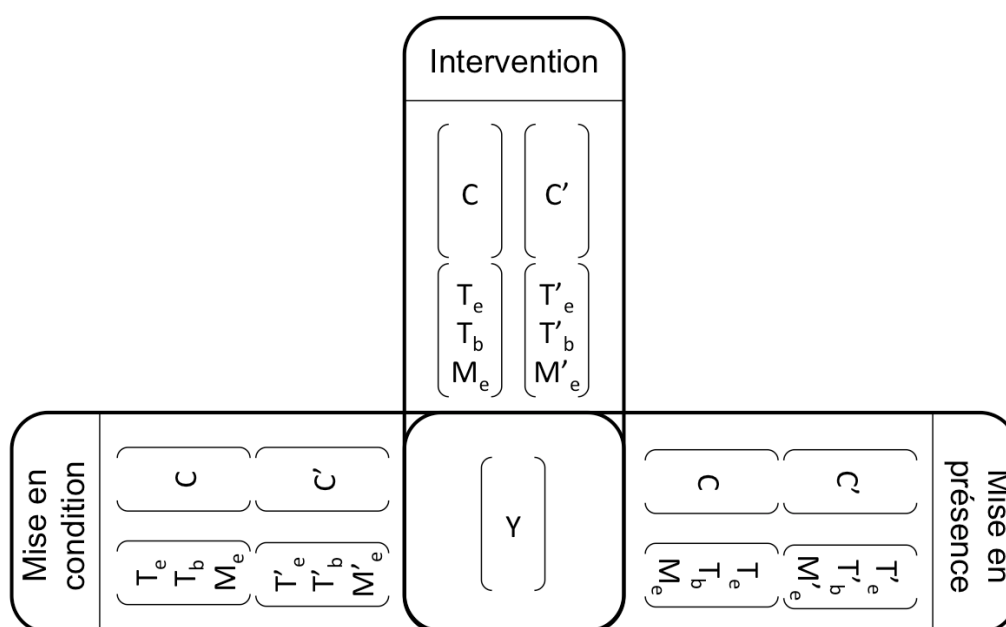
2.1.3 Evolution du périmètre des services

La plupart des travaux théoriques en sciences économiques, consacrés à la définition des activités de services, concernent, ce que nous appelons *l'intervention* de service (I), c'est-à-dire l'ensemble des activités de back-office et de front-office mobilisées pour rendre un service aux clients. C'est à la définition et à la conceptualisation de *l'intervention* de services que sont consacrés les travaux de Hill (1977, 1999), la métaphore du « triangle des services » (Gadrey, 2003), ou la décomposition fonctionnelle des services (Gadrey, 1991 ; Gallouj, 1999). Mais, notamment lorsque l'on s'intéresse aux consommations d'énergie, il est particulièrement important d'élargir la définition des services et leur périmètre¹²⁷.

L'intervention de service nécessite des interactions entre les prestataires, les clients et le support de la prestation de services, donc une certaine forme de *mise en présence* des différentes parties prenantes. Cette *mise en présence* (M_p) peut s'opérer par un déplacement en amont de l'intervention de service ou elle peut prendre la forme d'une mise en présence virtuelle sans déplacement par l'usage des TIC.

Par ailleurs, l'intervention de services se déroule dans un (ou plusieurs) lieu(x) qui sont *mis en condition* pour accueillir le service : aménagement, nettoyage, chauffage, éclairage, etc. Une partie de ces activités de *mise en condition* (M_c) nécessite des consommations d'énergie, principalement le chauffage, l'éclairage et la climatisation des lieux où se déroule le service.

Ainsi, pour adapter la représentation par les caractéristiques de Gallouj et Weinstein (1997) à l'analyse de l'évolution des consommations d'énergie, il est nécessaire d'y intégrer la *mise en présence* et la *mise en condition* des locaux (figure 3).



Avec C et C' respectivement les compétences des prestataires et des clients et T_e, T_b, M_e et T'_e, T'_b, M'_e respectivement les techniques et méthodes des prestataires et des clients (T_e les techniques énergétiques, T_b les techniques du bâti et M_e les méthodes d'utilisation des techniques énergétiques).

Figure 6. Une représentation du service adaptée à la question de la consommation énergétique.

Cette adaptation traduit un élargissement à la fois horizontal et vertical du périmètre traditionnel du service. L'intégration de la mise en présence traduit une extension horizontale du périmètre du service. Sa superficie est plus grande puisqu'elle prend en compte des activités jusque-là généralement exclues (la mobilité). L'intégration de la mise en condition des locaux traduit quant à elle une extension verticale : un niveau de détail plus fin sur les activités qui se situent dans le périmètre traditionnel du service. Il n'y a pas en théorie de difficulté à accepter ces trois catégories (I, M_p , M_c), mais, dans la pratique, les frontières entre elles peuvent être contingentes. Ainsi, dans le cas des services d'hébergement (hôtels, maisons de retraites, hôpitaux, établissements pénitentiaires), la frontière n'est pas claire entre

¹²⁷ Les travaux en sciences de gestion adoptent généralement aussi une définition élargie des services, et distinguent notamment les services de *cœur de métier* et les services de *soutien* (Shostack, 1977 ; Gronroos, 1990 ; Lovelock et al., 2004).

les activités de *mise en condition* comme le chauffage, l'éclairage ou le nettoyage et les activités d'*intervention de services*¹²⁸. Dans un service de transport, l'activité d'intervention est, pour l'essentiel, identique à l'activité de mobilité.

2.2 Un modèle d'analyse des répercussions énergétiques de l'innovation dans les services

La nouvelle représentation générale du produit fournit ainsi une heuristique intéressante pour identifier les relations entre l'innovation dans les services et l'évolution de la demande d'énergie par les services. À partir de cette heuristique nous voulons proposer un modèle d'analyse des dynamiques de l'innovation dans les services, adapté à l'étude des consommations d'énergie.

Nous mettons ainsi en évidence un certain nombre d'*axes d'innovation* à l'œuvre dans les services. Le premier axe d'innovation correspond à la recherche d'une baisse des consommations d'énergie finale, à service rendu identique. Les autres axes d'innovation n'ont pas, généralement, pour principal déterminant les consommations d'énergie, mais ils ont pourtant des répercussions directes sur leur niveau. Il s'agit, comme nous le verrons, des axes d'*enrichissement* du service, de *resserrement*, de *délégation* et de *mutualisation*.

2.2.1 L'axe d'efficacité énergétique

Le premier axe d'innovation correspond à la recherche d'efficacité énergétique, c'est-à-dire à la réduction des consommations d'énergie des services, à service rendu constant. À besoin de service constant, les consommations d'énergie dépendent des techniques tangibles consommatrices d'énergie (T_e , T'_e), des méthodes mises en œuvre (M_e , M'_e), des compétences des utilisateurs (C , C'), ainsi que des techniques du *bâti* (T_b , T'_b). Les innovations relevant de la logique d'efficacité énergétique se traduisent donc par une évolution d'un ou de plusieurs des vecteurs. Cette évolution peut prendre la forme de l'amélioration, l'ajout, la suppression, l'association ou encore la dissociation d'une ou de plusieurs caractéristique(s).

À besoin de services constant, une évolution du vecteur des techniques traduit, principalement, l'amélioration de la performance énergétique d'une technique existante, passant par l'évolution de ses caractéristiques techniques. Une évolution des compétences des utilisateurs peut, pour sa part, traduire l'aptitude des utilisateurs à réduire directement les consommations énergétiques ou leur capacité à mobiliser des techniques tangibles ou intangibles (méthodes, protocoles) qui réduisent les consommations énergétiques.

Différentes trajectoires d'innovation peuvent être envisagées, selon les différents éléments à l'origine de la demande d'énergie : le bâti, les techniques consommatrices d'énergie, les méthodes et compétences (c'est-à-dire le *comportement énergétique*). Les trajectoires d'innovation des techniques énergétiques et des techniques du bâti correspondent à l'amélioration de leurs performances énergétiques, généralement pour répondre aux exigences réglementaires ou pour obtenir une labellisation. Les trajectoires d'innovation des comportements énergétiques correspondent à la sensibilisation des individus et à la mise en œuvre de processus d'organisation moins consommateurs d'énergie.

Une autre innovation se développe depuis quelques années. Elle ne vise pas à réduire, directement, la demande d'énergie des services, mais à introduire un service élémentaire de production d'énergie (production décentralisée d'électricité à partir de panneaux solaires ou d'éoliennes, par exemple)¹²⁹. Il s'agit, ici, d'une modification des caractéristiques du service, plus spécifiquement de l'ajout d'un service élémentaire. On peut cependant considérer que cette innovation relève de l'axe d'*efficacité énergétique* car le service, dans ses caractéristiques de service *principales*, n'est pas modifié.

Ces innovations peuvent être intentionnelles, le fruit d'une stratégie raisonnée, ou involontaires, simples conséquences d'une évolution du contexte dans lequel s'inscrit le service. Par exemple, dans la mesure où les ampoules à incandescence classiques sont peu à peu éliminées du marché, la substitution par des lampes basse consommation ne sera pas nécessairement justifiée par un objectif explicite de l'utilisateur, mais plutôt par l'évolution de l'offre disponible. La réglementation thermique (RT 2005 et RT 2012) impose un certain niveau de performance énergétique pour les bâtiments neufs et, dans une moindre mesure, les bâtiments rénovés. De même l'adoption d'un comportement respectueux de l'environnement par les prestataires de service n'est pas nécessairement le résultat d'un effort volontaire de l'organisation de services, mais le simple résultat d'habitudes ou de normes sociales.

2.2.2 L'axe d'enrichissement du service

L'*enrichissement* du service correspond à une augmentation du besoin de services. Une augmentation du besoin de services correspond à une évolution du vecteur des caractéristiques de services qui se traduit, généralement, par une évolution des vecteurs des techniques et des compétences.

¹²⁸ Une distinction similaire existe pour la définition des normes de consommation d'énergie des bâtiments BBC. On distingue, en effet, les usages *process* (qui correspondent à ce que nous appelons l'intervention) et les usages *non process* (comparables à la mise en condition). La définition des usages *process* et *non process* est propre à chaque sous-branche du secteur tertiaire. Elle est discutable et fait d'ailleurs l'objet de négociations serrées entre les pouvoirs publics et les professionnels de la sous-branche.

¹²⁹ Généralement, l'énergie produite est revendue au fournisseur d'énergie à un tarif avantageux, ce qui permet de réduire, au total, le coût des consommations d'énergie. Cependant, les tarifs de rachat de l'électricité diminuent.

Il peut s'agir de l'adjonction de caractéristiques de services, voire de l'adjonction de services élémentaires¹³⁰. Ainsi, la dynamique de diversification des services (Gadrey, 1994 ; Djellal et Gallouj, 2007) relève de l'*enrichissement* du service. Dans le secteur de la santé, des cliniques privées haut de gamme proposent un service d'hébergement luxueux et un grand nombre de services périphériques, comme des services de balnéothérapie et d'équipements de remise en forme de qualité.

Il peut, également, s'agir de l'amélioration des caractéristiques de services existantes¹³¹. À titre d'exemple, le passage d'un service hospitalier traditionnel à un service *enrichi* peut se traduire par la mise à disposition de chambres et de lieux communs plus spacieux aux patients. Ces améliorations des caractéristiques de services entraînent une augmentation des besoins de *services de l'énergie* et donc, toutes choses égales par ailleurs, une augmentation des consommations d'énergie. L'amélioration des caractéristiques de services peut également prendre d'autres formes, comme l'amélioration de la performance *métier* d'une technologie (c'est-à-dire l'efficacité dans la réalisation de la fonction principale qui lui est assignée), qui se fait généralement au prix d'une dégradation des rendements énergétiques.

Il peut, finalement, s'agir d'une évolution dans la façon de *réaliser* certaines caractéristiques de services, principalement par la mise en place d'équipements ou de logiciels¹³². La tendance à la technicisation des activités, qui entraîne une hausse de la demande d'énergie, relève de la logique d'innovation d'enrichissement du service.

Les innovations relevant de cet axe ne visent pas à modifier les consommations d'énergie, mais à faire évoluer le service rendu aux clients. Pourtant, indirectement, elles influencent, à la hausse, le volume des consommations d'énergie. À moyen termes, le renforcement des contraintes énergétiques ou l'augmentation du coût de l'énergie pourraient accroître le poids des consommations d'énergie comme déterminants de l'innovation et éventuellement freiner le développement de ces innovations.

2.2.3 L'axe de resserrement du service

Le *resserrement* du service correspond à une réduction du besoin de services. Les besoins de services étant à l'origine de la demande d'énergie, les innovations relevant de cet axe induisent une baisse des consommations d'énergie. La réduction du besoin de services se traduit de diverses façons, en termes d'évolution des caractéristiques.

Il peut s'agir, tout d'abord, de la suppression d'une (ou de plusieurs) caractéristique(s) de services, voire de la suppression de services élémentaires. La réduction du besoin de services peut également se traduire par une réduction qualitative de certaines caractéristiques de services, ou encore par la formalisation et la standardisation des caractéristiques existantes, notamment par la mise en place de routines¹³³.

Le développement de services simplifiés avec les formules *low-cost* relève de cet axe. Le développement des services à distance, en tant qu'ils permettent de réduire ou de supprimer certains services de déplacement, relève également de cet axe.

Comme l'axe d'efficacité énergétique, le *resserrement* du service permet généralement des économies d'énergie. La distinction entre ces deux axes repose sur le déterminant de l'innovation. Pour les innovations relevant de l'axe de resserrement, le principal déterminant de l'innovation n'est pas la recherche d'économie d'énergie, mais la volonté de proposer un nouveau service. Cela étant dit, ces innovations permettent des économies d'énergie et, en cas d'augmentation du coût de l'énergie ou de renforcement des contraintes énergétiques, leur développement serait favorisé.

2.2.4 L'axe de délégation

La *délégation* correspond à une évolution dans l'attribution des tâches entre les parties prenantes au service, et donc dans la répartition des consommations d'énergie entre le client et le prestataire. Ces innovations ont, également, des répercussions sur les techniques ou les compétences mobilisées et donc sur le volume global des consommations.

La répartition des consommations d'énergie entre les parties prenantes au service dépend principalement du lieu où se déroule l'interaction (chez le prestataire, chez le client, à distance, etc.), de la nature de la mise en présence (déplacement physique ou mise en présence virtuelle) et de l'entité qui se déplace (le client ou le prestataire), tous ces éléments étant fortement liés. Ainsi, le développement de services à domicile relève de cet axe. Dans le cas d'un service à domicile, la mise en condition est réalisée par les techniques et les compétences du client du service, et non par les techniques et les compétences du prestataire. À l'inverse, une partie des déplacements des clients font place aux déplacements des prestataires. Le développement des services à distance relève également, en partie, de cet axe, quand il s'agit de substituer des livraisons aux déplacements des clients.

La *délégation* peut également s'exprimer dans le sens de la délégation de certaines tâches, traditionnellement réalisées par d'autres acteurs de la société, aux entreprises de services. Ainsi, les tendances au développement des services aux entreprises et des services aux ménages relèvent de cet axe. La *marchéisation* des services domestiques

¹³⁰ Une innovation incrémentielle ou architecturale, selon la terminologie de Gallouj et Weinstein (1997).

¹³¹ Une innovation d'amélioration, selon la terminologie de Gallouj et Weinstein (1997).

¹³² Une innovation de formalisation, selon la terminologie de Gallouj et Weinstein (1997).

¹³³ Respectivement des innovations incrémentielles, d'amélioration et des innovations de formalisation, selon la terminologie de Gallouj et Weinstein (1997).

correspond à la délégation des tâches, précédemment réalisée par les ménages, à des entreprises de services. Du point de vue des consommations d'énergie du secteur des services, cela se traduit, toutes choses égales par ailleurs, par une hausse des consommations d'énergie.

La *délégation* est une logique qui s'exprime lorsque l'on étudie un système. Si l'on adopte le point de vue d'un établissement de services, cette logique correspond soit à un *enrichissement*, soit à un *resserrement* du service. Ainsi, par exemple, le développement d'un service de livraison dans le commerce de détail, correspond, en soi, à une délégation, par laquelle un service traditionnellement rendu par le client (le service de déplacement du client) est délégué aux prestataires du service de commerce. Du point de vue du service rendu par l'établissement de commerce de détail, il s'agit d'un enrichissement du service.

2.2.5 L'axe de mutualisation

La *mutualisation* correspond à la combinaison de plusieurs services similaires, initialement réalisés par différents prestataires. Il s'agit, par exemple, de regrouper les activités de plusieurs organismes au sein d'une même entité. Les innovations relevant de cet axe visent la rationalisation des services, c'est-à-dire la réduction globale des coûts et des équipements utilisés. Elles peuvent alors se traduire par une réduction des consommations d'énergie, bien que les économies d'énergie soient rarement à l'origine de la décision d'innovation.

Il s'agit ici de combiner des services identiques, afin d'augmenter le poids ou la valeur de certaines caractéristiques de services. Au niveau inter-organisationnel, les innovations relevant de la *mutualisation* n'entraînent pas une augmentation du service rendu (contrairement à celles relevant de l'*enrichissement*). Mais l'augmentation du poids et de la valeur de certaines caractéristiques de services peut permettre une évolution des vecteurs des techniques (des économies d'échelle) : une diminution du nombre d'équipements et de consommables nécessaires.

Cet axe d'innovation s'exprime dans les activités pour lesquelles des économies d'échelle sont possibles et dans les activités que les organisations acceptent d'*externaliser*, c'est-à-dire principalement les activités périphériques ou de soutien au cœur de métier de l'activité. Ces innovations concernent, d'une part, les activités de services qui externalisent une partie de leurs services périphériques (la restauration dans l'enseignement ou la santé, par exemple) et, d'autre part, les activités industrielles qui externalisent une partie de leurs fonctions de services (la facturation, les ressources humaines, la restauration, etc.). L'économie de la fonctionnalité ou le développement des *produits-services*¹³⁴ relève également, en partie, de cette logique. Il s'agit alors de mutualiser les services rendus par différents équipements. Toutes choses égales par ailleurs, la mutualisation des équipements permet de réduire le nombre d'équipements nécessaires et donc les consommations d'énergie pour les produire.

2.2.6 La combinaison de plusieurs axes

Dans la réalité, les innovations relèvent généralement de plusieurs de ces axes. Ainsi, le développement du commerce en ligne relève à la fois de l'axe d'*enrichissement*, de l'axe de *resserrement* et de l'axe de *délégation*. Le *resserrement* du service correspond à la suppression du service de *mise en condition* de la zone de vente et des consommations d'énergie associées. L'*enrichissement* du service s'exprime par l'ajout des services tels que la *mise en présence virtuelle* ou le *conditionnement des produits* et donc une hausse des consommations d'énergie. Finalement, la *délégation* se traduit par une évolution des déplacements : le client ne se rend plus sur le lieu de vente pour retirer son colis, mais c'est souvent le prestataire qui lui livre.

3 Les dynamiques d'innovation dans le secteur du commerce de détail alimentaire et leurs répercussions énergétiques

L'innovation dans les services de commerce a fait l'objet d'une littérature abondante (McNair, 1958 ; Hollander, 1960 ; Levy *et al.*, 2005 ; Gallouj et Toivonen, 2009). Il existe également une littérature, certes moins abondante, consacrée aux répercussions énergétiques des innovations organisationnelles dans le commerce. Cette littérature met l'accent sur une tendance spécifique de l'innovation, à savoir le développement du e-commerce non-alimentaire (Abukhader et Jönson, 2003 ; Williams et Tagami, 2003 ; Edwards *et al.*, 2010).

Notre objectif est, ici, d'élargir cette réflexion pour rendre compte des principales dynamiques d'innovation et de changement dans le commerce de détail alimentaire et de leurs impacts énergétiques. Nous nous appuyons sur les entretiens que nous avons réalisés, ainsi que sur le modèle d'analyse développé dans la section précédente.

¹³⁴ Un nouveau modèle économique qui substitue la vente de l'usage d'un bien à la vente du bien lui-même. Ce modèle économique a plusieurs intitulés, pour plusieurs angles d'analyse et plusieurs écoles de pensée. C'est ce modèle qui est au cœur de l'économie de la fonctionnalité (Giarini et Stahel, 1990 ; Stahel, 1998 ; Bourg et Buclet, 2005 ; Du Tertre, 2007), de l'économie quaternaire (Debonneuil, 2010), de l'économie de l'expérience (Pine et Gilmore, 1998) ou de la *service dominant logic* (Lusch, 2006), mais aussi des concepts d'Eco-Efficient Services (Meijkamp, 1998, 2000 ; Bartolomeo *et al.*, 2003).

3.1 Le développement d'offres de commerce simplifiées

Deux formats de commerce se développent particulièrement, ces dernières années : les commerces de proximité (dont les commerces de type *hard-discount*) et les formules de type *drive*. Ces formats correspondent à des offres simplifiées (une logique de resserrement du service), comparativement aux hypermarchés traditionnels, en ce qu'ils proposent un assortiment de produits moins large, moins de services périphériques et, dans le cas du *drive*, aucun accueil du client sur la zone de vente.

Actuellement, en France, le nombre d'hypermarchés ne progresse presque plus¹³⁵ et les nouvelles implantations, dans le commerce de détail alimentaire, correspondent principalement à des commerces de proximité de type supermarché ou supérette de centre-ville (Pompougnac, 2009 ; Jaffredo, 2009 ; Parabellum et Bossman Consultants, 2012). Ainsi, le nombre de commerces de proximité a cru, en moyenne, de 0,6% par an en France entre 2002 et 2008 (Solard, 2010). En termes de parts de marché, ce format de commerce a atteint plus de 6% du marché de l'alimentaire en 2011, soit une augmentation de 0,2 points par rapport à l'année précédente (enquête Kantar Worldpanel pour 2011). Les commerces de proximité sont constitués à la fois des commerces d'alimentation spécialisés, et non spécialisés (dont les petits supermarchés, les supérettes, etc.). Ce sont ces derniers qui connaissent une croissance particulièrement dynamique (Désaunay, 2012).

Dans la catégorie des commerces de proximité, on compte les commerces de type *hard-discount* (HD) qui sont, généralement, des magasins de petite taille. Leur expansion a été particulièrement importante dans les années 2000. Aujourd'hui, elle semble fléchir en France (Michel, 2010 ; Puget, 2012).

Les *drives*, pour leur part, ont fait leur apparition il y a quelques années. Ils ne représentent encore qu'une faible part de marché des produits de grande consommation (moins de 2% en 2012, d'après des données de LSA), mais ils sont l'un des principaux vecteurs de croissance actuellement, représentant 80% de la croissance de Auchan et 33% de celle de Leclerc (sur les produits de grande consommation, en 2011, données LSA). Actuellement, toutes les grandes enseignes sont présentes sur ce segment d'activité. Il existe deux formes principales de *drive* : le *drive* accolé au magasin et le *drive* indépendant. Auchan est le premier à avoir ouvert des *drives* indépendants avec les *Chrono Drive*. System U, au contraire, ouvre principalement des *drives* accolés à des magasins de l'enseigne. Dans ce cas, le *drive* n'a pas ou peu d'entrepôts dédiés, son ouverture est plus simple et moins coûteuse, mais son organisation est plus compliquée.

3.1.1 Les moteurs du développement des formats de magasin simplifiés.

L'évolution de la demande des consommateurs est la principale explication du développement des formats de magasin simplifiés comme les commerces de proximité ou le e-commerce. Du fait de l'évolution des modes de vie, notamment de l'augmentation de la part des femmes qui travaillent et de la valorisation du temps libre, faire les courses alimentaires devient une activité pénible à laquelle on veut consacrer peu de temps. Dans ce contexte, le commerce de proximité et le commerce en ligne sont préférés aux grands hypermarchés de périphérie (Lemoine, 2010 ; Désaunay, 2012). Certains chercheurs évoquent également une évolution des valeurs des consommateurs, qui donnent de plus en plus d'importance à des critères comme la taille humaine des commerces, la proximité (relationnelle et géographique) avec les commerçants et l'origine locale des produits (Lemoine, 2010, Dujin *et al.*, 2011 ; Désaunay, 2012 ; Ifop, 2012).

L'urbanisation, le vieillissement de la population (et notamment la migration des ménages âgés dans les centres villes), ainsi que la réduction de la taille des foyers¹³⁶ favorisent également le développement des formats de commerce simplifiés et plus accessibles, comme les commerces de proximité (Lemoine, 2010 ; Désaunay, 2012).

Finalement, du fait de la hausse du coût des énergies, les Français cherchent, de plus en plus, à réduire leur budget pour les déplacements. Cet élément joue en défaveur des grands hypermarchés situés en périphérie des villes, pour lesquels les déplacements en voiture sont quasiment obligatoires et en faveur des commerces de proximité, de la livraison, ou des *drives* (dans lesquels on peut se rendre sur le chemin de retour du travail ou d'une autre activité).

Les petits commerces (commerces de proximité et *hard-discount*) bénéficient également d'une législation favorable, puisque un permis de construire suffit pour ouvrir un commerce de moins de 1000 m². Plus globalement, il existe une volonté des pouvoirs publics de redynamiser les centres villes, qui passe par le retour des commerces de périphérie dans les centres (Lemoine, 2010).

Cependant, dans les centres villes, les commerces de proximité sont confrontés aux contraintes de la logistique urbaine : la congestion de trafic, la pollution locale, les nuisances sonores, la sécurité routière, les réglementations spécifiques à la circulation en ville, etc. Les magasins cherchent donc des solutions pour faire face à ces difficultés. Des solutions innovantes émergent, comme la livraison de nuit, ou le développement de l'approvisionnement par voie fluviale ou ferroviaire. La multiplication des points de vente pose également des difficultés : les volumes à livrer sont moins importants, les points de livraisons plus nombreux et, par conséquent, l'approvisionnement est moins efficient. Le manque d'espace disponible en ville limite, par ailleurs, les nouvelles installations. Finalement, le comportement du

¹³⁵ Pour autant, cette évolution ne signifie pas la disparition des hypermarchés, dont presque aucune fermeture n'a été constatée, ni la diminution des surfaces des commerces existants (Ferrante, 2012).

¹³⁶ Pour un faible volume d'achat, il n'est pas nécessairement rentable de se rendre dans un hypermarché (Parabellum et Bossman Consultants, 2012).

consommateur est différent : il vient plus régulièrement, pour un panier moyen moindre. Le commerce de proximité doit s'adapter à cette demande particulière.

Le commerce en ligne, appliqué à l'alimentaire, est longtemps resté tout à fait marginal, du fait des difficultés logistiques qu'il pose. Dans les premiers temps, le commerce en ligne s'accompagnait d'une offre de livraison des clients. Or, celle-ci pose plusieurs difficultés. Certaines sont spécifiques aux produits frais alimentaires, qui sont difficiles à transporter et pour lesquels la chaîne du froid doit être respectée. Contrairement à la phase d'approvisionnement où chaque produit est livré, en grande quantité, au commerce ou à l'entrepôt, dans le cas de la livraison à domicile c'est un panier de course hétérogène contenant une grande diversité de produits, en petite quantité, qui doit être livré aux clients. Par ailleurs, en milieu rural, du fait des distances importantes à parcourir, la livraison représente un coût important que ni les commerçants ni les clients ne semblent prêts à prendre en charge. C'est en zone urbaine que la livraison se développe, mais sa croissance est limitée par des difficultés liées cette fois à des enjeux de logistique urbaine : congestion du trafic¹³⁷, pollution, etc. Finalement, la livraison pose une dernière difficulté, qui n'est pas spécifique aux produits alimentaires : le client doit être présent sur le lieu de livraison, pour réceptionner les colis. Cette nécessité entraîne de nombreux ratés et augmente la complication et le coût de la livraison (Bratt et Persson, 2001 ; Siikavirta *et al.*, 2003).

Si les difficultés de la livraison ont pu être un frein au développement du commerce alimentaire en ligne, les enseignes du commerce de détail proposent une nouvelle solution depuis quelques années : le drive. Celui-ci permet de proposer une solution de commerce sur Internet tout en s'affranchissant de la contrainte de la livraison. Pour les clients, cette solution présente de nombreux avantages par rapport au commerce traditionnel. Elle permet notamment de faire ses courses rapidement. Elle est également plus flexible que la livraison (pas de rendez-vous à prendre, le client se rend au drive quand il le souhaite) et moins coûteuse (gratuite, en général). Malgré sa part de marché encore faible, le drive est actuellement un moteur majeur de la croissance des enseignes.

3.1.2 Des services simplifiés, moins consommateurs d'énergie.

Pour étudier les éventuelles répercussions énergétiques du développement de ces services simplifiés, nous comparons la demande d'énergie des formats simplifiés (commerces de proximité et commerces en ligne avec drive) à celle des grands commerces de type hypermarchés et grands supermarchés, qui, actuellement, représentent le cœur de l'offre du commerce de détail alimentaire.

3.1.2.1 Comparaison des consommations d'énergie entre un petit commerce de type commerce de proximité ou hard-discount et un grand commerce de type hypermarché.

Le service d'intervention. La principale différence entre les caractéristiques de service d'un hypermarché et celles d'un commerce de proximité, du point de vue des consommations d'énergie, c'est la proportion de linéaires froids. Alors que, dans un hypermarché, les produits alimentaires frais représentent environ 35%, en moyenne, de la surface de vente, dans un supermarché leur proportion atteint les 45% (données ACNielsen 2007/ FCD). Nous n'avons pas trouvé de données aussi précises concernant les plus petits formats de commerce alimentaire (du fait de leur hétérogénéité, peu de données sont disponibles), mais il est communément admis que plus la surface de vente est petite et plus la part des produits alimentaires et frais est importante. Une proportion supérieure de linéaires froids signifie des consommations unitaires (par unité de surface) plus importantes (la production de froid étant le plus gros poste de consommation dans les commerces).

Les compétences disponibles dans un commerce de proximité ou un hypermarché ne sont pas identiques. Si les hypermarchés peuvent se permettre d'embaucher un technicien pour s'occuper quasi exclusivement des questions d'énergie, ce n'est pas le cas des plus petits formats de magasin. Par conséquent, les commerces de proximité auront plus de difficultés à suivre et maîtriser leurs consommations d'énergie. Ce constat concerne autant le service d'intervention que le service de *mise en condition*.

Le service de mise en condition. La principale différence entre les commerces de proximité et les hypermarchés concerne les techniques du bâti. Les commerces de proximité sont situés en centre-ville, où l'offre de bâtiments est limitée. L'ouverture d'un nouveau magasin correspond généralement à la reprise d'un bâtiment (et non à une construction neuve). Les choix du lieu d'implantation sont dictés par les disponibilités et le critère de la performance des locaux est peu pris en compte. Par ailleurs, les locaux sont loués, le plus souvent. La location constitue un frein à la mise en œuvre de travaux d'amélioration des performances énergétiques : le propriétaire ne souhaite pas effectuer des travaux dont il ne bénéficierait pas directement et le locataire ne souhaite pas effectuer des travaux dont il ne profiterait que pour un laps de temps donné et pour lesquels le temps de retour sur investissement serait supérieur à son bail. C'est une barrière à l'efficacité énergétique reconnue (le problème des incitations partagées), qui pourrait cependant être levée avec la généralisation du *bail vert*.

Le service de mise en présence. Les caractéristiques de service de l'approvisionnement et des déplacements des clients évoluent. Concernant l'approvisionnement, nous avons vu que les livraisons d'un hypermarché ou d'un magasin de proximité sont très différentes : celles d'un magasin de proximité sont plus petites en volume, moins fréquentes et

¹³⁷ La congestion du trafic, quand elle est associée à (ou accentuée par) des camions des enseignes du commerce de détail, véhicule une mauvaise image des enseignes.

moins régulières. Cette évolution a des répercussions sur les méthodes ou routines d'approvisionnement. Les méthodes d'optimisation de l'approvisionnement ont, jusqu'à présent, été surtout réfléchies pour le format hypermarché et ne sont pas adaptées aux commerces de proximité : quantités moindres, livraisons plus erratiques et livraisons urbaines. Actuellement, de nouvelles méthodes sont en cours d'expérimentation (la livraison de nuit, par exemple), mais l'approvisionnement des commerces de proximité reste moins efficient et donc plus consommateur d'énergie, que celui des hypermarchés. Par ailleurs, les horaires de livraison des commerces de proximité, situés en ville, sont plus contraints, du fait des réglementations de circulation. Les moyens de transport utilisés (une technique consommatrice d'énergie) doivent être adaptés : plus petits, moins bruyants, moins polluants, etc. Certains projets expérimentent le recours à des modes de transport nouveaux, comme la livraison par tramway.

Concernant les caractéristiques de services des déplacements des clients, les distances parcourues pour se rendre à un commerce de proximité sont plus courtes que pour un hypermarché. Les commerces de proximité sont localisés dans les centres villes, dans des lieux de passage. Un client qui se rend dans un commerce de proximité ne réalise pas un long trajet, le magasin qu'il choisit est proche de son lieu d'habitation ou sur un trajet qu'il effectue régulièrement pour un autre motif. Cette évolution des caractéristiques de service, couplée à la réduction du panier moyen acheté, a des répercussions sur le choix du mode de transport du client : ce dernier aura plus facilement recours à des modes de transport doux ou aux transports en commun pour faire ses courses. Moins longs et réalisés avec des modes de transport plus économes en énergie, les déplacements des clients sont moins consommateurs d'énergie dans le cas d'un achat dans un commerce de proximité que dans celui d'un achat dans un hypermarché. À l'échelle globale, même si l'on tient compte du fait que les clients se rendent de façon plus régulière dans les commerces de proximité, l'avantage en termes de dépense énergétique reste au commerce de proximité (Browne *et al.*, 2008 ; Rizet *et al.*, 2010).

3.1.2.2 Comparaison des consommations d'énergie entre un drive et un hypermarché

Le service d'intervention. Les innovations affectant les interventions concernent principalement l'accueil du client, la préparation et la mise à disposition des marchandises. Le service élémentaire d'accueil des clients sur le lieu de vente (et les consommations d'énergie associées) est en partie supprimé dans le cas du drive. Le service élémentaire de fabrication (comme les traiteurs ou bouchers, dans le commerce de détail) est également souvent supprimé. Celui du maintien des produits frais à température n'a plus lieu que dans les zones de réserves.

En revanche, un nouveau service élémentaire est introduit : le conditionnement des commandes. Il s'agit d'emballer les marchandises commandées par les clients. Les techniques requises sont principalement non énergétiques : cartons, emballages plastiques, éléments de calage, diables, etc. Lorsque le conditionnement est réalisé à très grande échelle et pour des produits homogènes, il peut être automatisé et réalisé par des machines. Dans le cas du drive, c'est rarement le cas, et ce service est peu consommateur d'énergie. Les caractéristiques de service du conditionnement sont notamment le poids du colis, sa taille, son contenu (et l'hétérogénéité de celui-ci), ses conditions de conservation (pour les aliments frais), sa fragilité, etc. Ces caractéristiques de services influencent le choix des techniques utilisées pour le service de mise en présence.

La mise en condition. Les services élémentaires de mise en condition des locaux destinés à recevoir les clients et des laboratoires de préparation de certaines commandes sont supprimés. Dans le cas du drive, les locaux à mettre en condition se limitent, pour l'essentiel, à des bureaux, des locaux techniques (informatiques, notamment) et des entrepôts. Les caractéristiques de service de la mise en condition dépendent fortement des locaux auxquels la mise en condition s'applique. Or, en comparaison d'une zone de vente, les locaux maintenus dans le cas du drive exigent des niveaux de température et d'éclairage plus faibles¹³⁸ et un volume moindre (le nombre de produits disposés par unité de volume est supérieur). Au total, pour la mise en condition, le bilan des consommations d'énergie est en faveur du drive.

La mise en présence. Dans le e-commerce, les clients ne se déplacent plus vers les locaux de commerce pour sélectionner leurs achats, le choix se fait à distance, par le biais d'un nouveau service élémentaire : la mise en présence virtuelle. Dans ce nouveau service élémentaire, les techniques consommatrices d'énergie du prestataire sont les serveurs, le site Internet, etc. Celles du client sont principalement l'ordinateur à partir duquel il se connecte. Les caractéristiques de ce service, comme la durée de connexion ou la quantité de données transmises, influencent les consommations d'énergie. La mise en œuvre de ce nouveau service entraîne des consommations d'énergie pour le client et le prestataire. À l'échelle de l'ensemble des transactions de commerce, ces consommations d'énergie, qui correspondent au fonctionnement des serveurs sont, généralement, considérées comme très importantes (Faucheux *et al.*, 2002). Cependant, elles ne sont qu'en faible partie attribuables aux achats en ligne¹³⁹ et, encore en plus faible partie, aux achats de biens alimentaires pour le drive. Par ailleurs, ces consommations existent aussi pour le commerce traditionnel, puisque les acheteurs se rendent, de plus en plus souvent, sur les sites Internet avant leurs achats pour comparer les prix et les produits.

¹³⁸ Même si, dans le cas du e-commerce alimentaire un certain nombre d'entrepôts doivent être maintenus à basse température pour la conservation des aliments, ces derniers peuvent être plus efficaces énergétiquement que les meubles froids des zones de vente, n'étant pas soumis aux mêmes contraintes d'accessibilité et de confort rendues nécessaires par la présence du client.

¹³⁹ Moins de 5% des visites de sites Internet de vente sont motivées par l'achat selon l'enquête de Carat Expert de 2005, enquête réalisée auprès de 500 internautes en mai 2005 et rapportée par le Journal du Net.

Les marchandises acquises sont des biens tangibles non échangeables virtuellement, d'où la nécessité pour les clients, suite à l'achat, de se déplacer pour retirer leurs paniers de produits. Il n'y a pas de raison de penser que les distances entre le domicile de l'acheteur et le point de retrait de la marchandise diminuent sensiblement (par rapport au commerce traditionnel), sauf à envisager un développement massif des drives et donc un maillage plus important sur le territoire. Bien que cette distance reste identique, de nombreux acteurs du secteur considèrent que la distance réellement parcourue pour se rendre au point de retrait est plus faible que celle parcourue pour se rendre dans un commerce traditionnel. La durée de l'intervention (l'une des caractéristiques de service de l'*intervention*) est très courte dans le cas de l'enlèvement des marchandises dans un drive, ce qui permet à l'acheteur de combiner le déplacement vers le drive avec un déplacement pour un autre motif : il peut se rendre au drive sur le chemin du retour du travail, par exemple.

Au total, la formule de l'enlèvement de la marchandise dans un drive permet, en théorie, de réduire les consommations d'énergie pour la *mise en présence*. À notre connaissance, il n'existe que très peu d'études portant sur l'estimation des gains énergétiques permis par le drive en comparaison du commerce traditionnel ou de la livraison. L'une d'entre elles nous a paru particulièrement intéressante puisqu'elle propose une estimation des gains en termes de km parcourus et d'occupation de l'espace par semaine, selon différents scénarios de développement du e-commerce, en termes de parts de marché, mais aussi de choix logistiques : livraison ou enlèvement (Durand *et al.*, 2010). Les résultats de l'estimation indiquent que la formule de drive est la plus performante en termes de distance parcourue.

3.2 La diversification des canaux de distribution

Actuellement, l'une des stratégies des enseignes du commerce de détail alimentaire consiste à diversifier les canaux de distribution. Cette diversification s'exprime au niveau des magasins, par le développement de services périphériques tels que le drive, la livraison à domicile, l'offre de produits discount, etc. Elle s'exprime, également, à l'échelle des enseignes qui proposent aux consommateurs divers formats de magasins : des hypermarchés en périphérie, des commerces de proximité, des drives, etc. Ainsi, les services simplifiés, que nous avons examinés dans la section précédente, ne se substituent pas, dans la réalité, aux services traditionnels, mais ils s'ajoutent plutôt à eux. Cette dynamique d'innovation relève donc, à l'échelle des enseignes du commerce de détail, d'un *enrichissement* du service, selon la terminologie introduite dans la section 2.

Les dynamiques décrites dans les modèles d'innovation du type de la roue de la distribution ou de la théorie de l'accordéon (McNair, 1958 ; Hollander, 1960) ne sont pas validées, ici. Ces dynamiques traduisent la répétition du processus de simplification puis de diversification des formats de distribution : les nouveaux formats pénètrent le marché en proposant des prix bas et peu de services, ils ont des marges faibles, peu à peu ils se développent et se diversifient, jusqu'à devenir chers et vulnérables aux nouveaux entrants. Or, la dynamique que nous décrivons correspond plutôt au développement simultané des différents formats de commerce, au sein des enseignes : des formats simplifiés, comme les commerces de proximité, les commerces de type hard-discount ou le commerce en ligne et des formats diversifiés, comme des hypermarchés proposant un large assortiment et de nombreux services périphériques. Cette dynamique peut éventuellement être décrite selon le modèle du Big Middle (Levy *et al.*, 2005)¹⁴⁰. Le hard-discount, le drive, le commerce de proximité qui appartenaient respectivement aux segments *bon marché*, *innovant* et *en danger*, intègrent, peu à peu, le segment *Big Middle*.

3.2.1 Les moteurs de la diversification des canaux de distribution

Plusieurs phénomènes peuvent expliquer cette tendance à la diversification des canaux de distribution dans le commerce alimentaire de détail. Pour commencer, le modèle de l'hypermarché, qui représentait jusqu'à présent le Big Middle du commerce alimentaire, voit ses perspectives de croissance ralentir, du simple fait que le territoire soit déjà densément maillé. D'après des données de l'INSEE, il y aurait, en France, un hypermarché pour 46000 habitants, une densité supérieure à celle de beaucoup de pays européens. Les grandes enseignes de la distribution alimentaire cherchent, donc, de nouvelles opportunités de développement.

Par ailleurs, face à l'expansion du hard-discount depuis les années 2000 et au développement du commerce sur Internet (bien qu'encore limité dans le secteur alimentaire), les grands groupes de la distribution alimentaire doivent repenser leur offre. Certaines enseignes ont racheté ou développé des filiales spécialisées dans le hard-discount (Dia pour Carrefour, Leader Price pour Casino, etc.), mais globalement, la stratégie de la plupart d'entre elles a été de développer, en parallèle de leur offre traditionnelle, de nouvelles offres, comme des offres discount ou des offres de commerce en ligne.

La diversification des canaux de distribution permet aux enseignes d'acquérir un avantage concurrentiel et de conquérir une part plus importante du marché alimentaire (Rosenbloom, 2007 ; Bezès, 2012). En particulier, cette stratégie leur permet de toucher plus de clients, en communiquant plus largement sur leur offre, par le biais des différents canaux de distribution (Ansari *et al.*, 2008).

¹⁴⁰ Le modèle du Big Middle traduit une segmentation du secteur du commerce entre un segment Big Middle regroupant le(s) format(s) de commerce dominant(s), un segment *innovant* et un segment *bon marché* qui peuvent être rentables sur le court-terme, mais qui, pour se développer et augmenter leurs profits, doivent s'intégrer au segment Big Middle, et un segment *en danger* où peuvent tomber les commerces du Big Middle s'ils relâchent leurs efforts et proposent trop peu d'innovations ou des prix trop élevés.

3.2.2 Les répercussions énergétiques complexes de la diversification des canaux de distribution.

Cette dynamique d'innovation relève, à l'échelle des magasins ou des enseignes, d'un *enrichissement* du service, dans le sens où, les magasins et les enseignes se développent et proposent plus de services. Les services qui se développent le plus (le drive et le commerce de proximité) sont, individuellement, moins consommateurs d'énergie que les formats de commerce traditionnel. Cependant, comme nous venons de le voir, ces formats ne se substituent pas totalement aux grands commerces, mais s'y ajoutent en partie.

À l'échelle d'un établissement ou d'une enseigne, l'ajout de services supplémentaires se traduit, toutes choses égales par ailleurs, par une augmentation des consommations d'énergie, relatives à la réalisation du supplément de services (l'intervention supplémentaire, la mise en condition de l'extension éventuelle du bâtiment, les déplacements additionnels engendrés, etc.). Cependant, la mise en œuvre de ces services périphériques a des répercussions directes sur l'ensemble du service de commerce et de ses caractéristiques de services. En particulier, le chiffre d'affaires total de l'établissement ou de l'enseigne évolue (l'objectif de l'adjonction de ces services périphériques est de le faire croître). Le chiffre d'affaires attribuable au service de commerce traditionnel évolue également, plutôt à la baisse, pour sa part, les nouveaux formats s'y substituant en partie. À l'échelle du pays, les répercussions globales sur les consommations d'énergie dépendent, donc, du degré de substitution de ces formats simplifiés aux formats traditionnels.

3.3 La mise en œuvre d'une logistique mutualisée

La logique de *mutualisation* s'exprime, principalement, au sein de l'activité de logistique d'approvisionnement¹⁴¹. Elle se traduit par le regroupement de plusieurs partenaires de la chaîne logistique pour réaliser leurs activités logistiques au sein d'un même entrepôt et livrer ensemble leurs clients (les commerces).

L'une des premières expériences françaises de mutualisation a été mise en place en 2004 par les entreprises Sara Lee et Cadbury, des concurrents sur le marché de l'agro-alimentaire. À partir de plateformes en propre, elles livrent ensemble leurs distributeurs. Les industriels Reckitt-Benckiser, Henkel et Colgate, des concurrents sur le marché des produits DPH (Droguerie, Parfumerie, Hygiène), ont également choisi de mutualiser leur logistique, depuis 2006. Ils ont deux entrepôts en commun en France, à partir desquels ils livrent ensemble leurs clients (Le Moigne et Bouniol, 2008). Danone, ID Logistic et Carrefour se sont également organisés et ont mis en place un EMCA, dont nous expliquons le principe dans le paragraphe suivant.

Plusieurs types de schémas de logistique mutualisée voient le jour. Un premier exemple correspond à la consolidation, mise en place notamment par Carrefour. Historiquement, chaque usine livrait en direct les centres de distributions régionaux d'une enseigne. Ce type d'organisation est illustré par la figure 4.

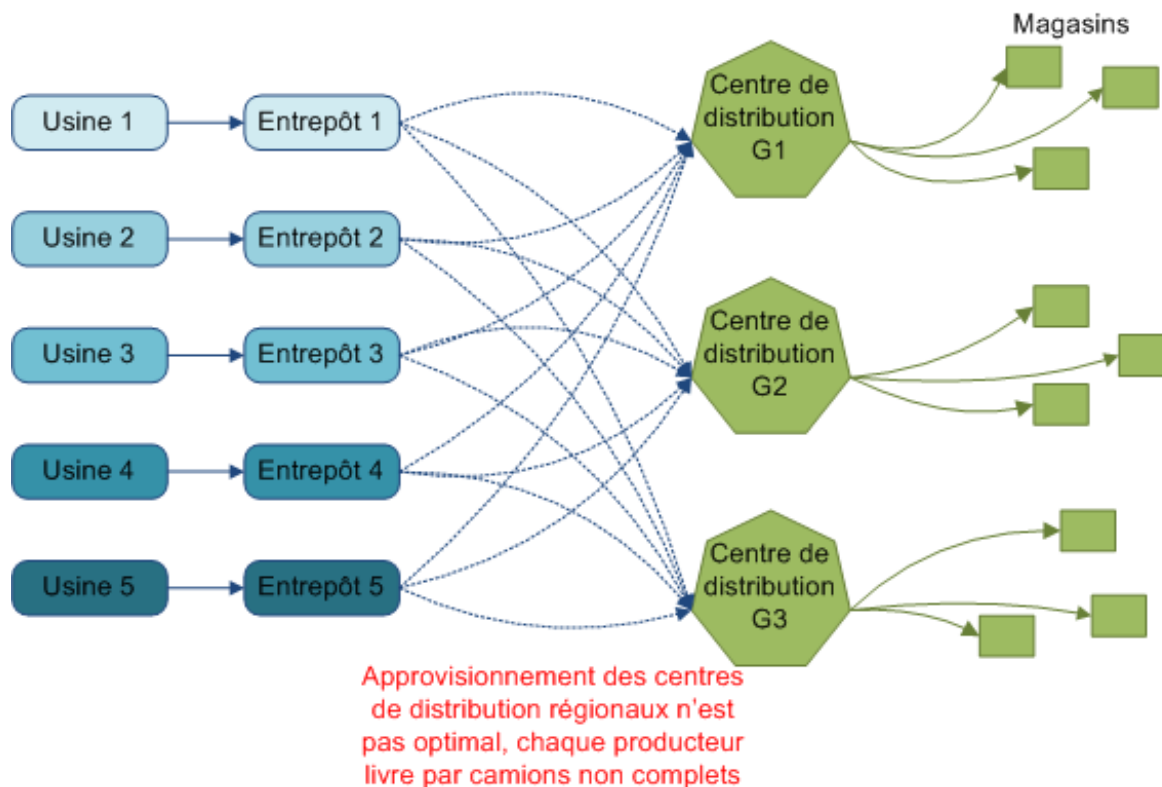


Figure 7. Schéma logistique traditionnel et non optimal.

¹⁴¹ La logistique est exclue du périmètre traditionnel du commerce de détail, cependant, ici, nous avons élargi ce périmètre pour tenir compte de l'ensemble des sources de consommation d'énergie des services.

Actuellement, Carrefour met en place des Centre de Consolidation et de Collaboration (CCC). L'enseigne demande aux usines de livrer ces CCC, à partir desquels elle prend en charge toute la logistique. Puisque le CCC contient de nombreuses références, Carrefour peut livrer ses magasins avec des camions complets. Nous illustrons cette organisation dans la figure 5.

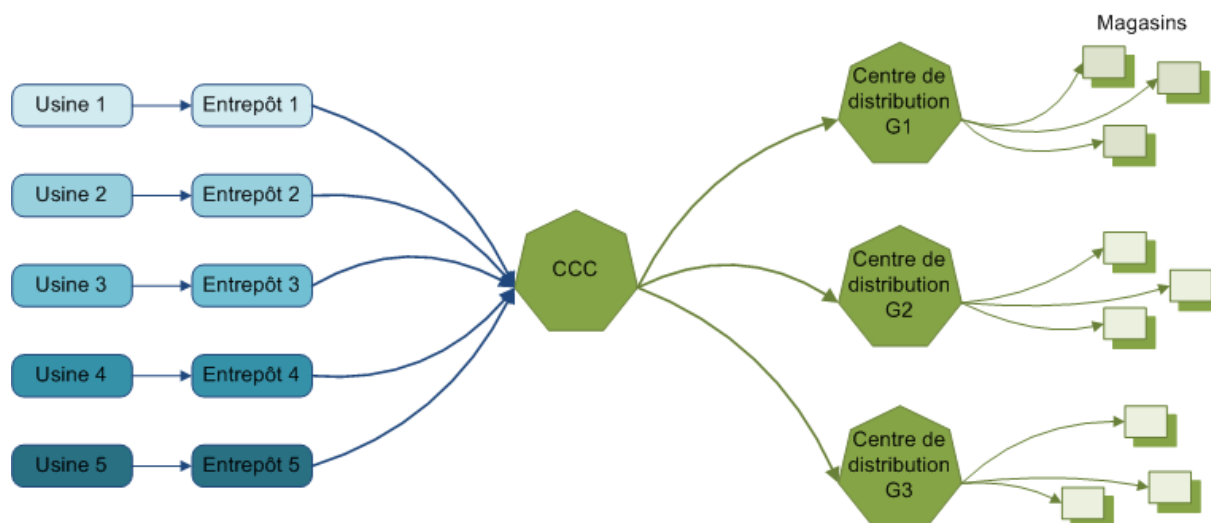


Figure 8. Exemple de logistique mutualisée : les Centres de Consolidation et de Collaboration (CCC).

Un autre modèle intitulé l'EMCA (Entrepôt Mutualisé de Consolidation Aval) est à l'œuvre. Les stocks sont repoussés en amont de la chaîne logistique, ce qui libère de la surface chez les distributeurs. Cette surface disponible peut servir de zone de stockage à un industriel. Ainsi, l'industriel peut livrer, en flux tendu, le distributeur en question, mais également d'autres distributeurs à proximité. Ce type d'organisation est illustré par la figure 6.

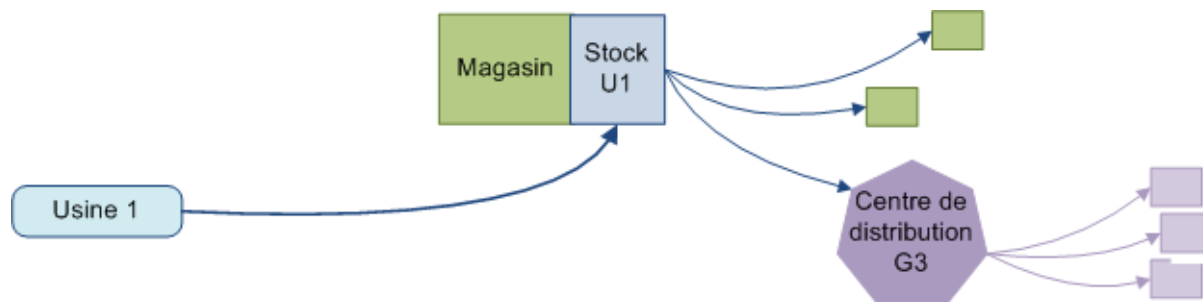


Figure 9. Exemple de logistique mutualisée : les Entrepôts Mutualisés de Consolidation Aval (EMCA)

3.3.1 Les moteurs de la mise en œuvre d'une logistique mutualisée

La mutualisation des moyens logistiques constitue, tout d'abord, une réponse à l'évolution du cadre réglementaire régissant les relations entre industriels et distributeurs (Livolsi et Camman, 2012). En particulier, la Loi de Modernisation de l'Économie durcit les contraintes de la logistique. Pour y faire face, industriels et distributeurs semblent s'orienter vers une réorganisation de leur logistique.

La mise en œuvre d'une logistique mutualisée répond, également, à une recherche de performance économique, ainsi qu'au renforcement des contraintes environnementales. La mutualisation des entrepôts et/ou des transports permet d'optimiser le nombre d'entrepôts et de camions nécessaires, d'organiser des tournées plus efficaces pour la livraison des commerces, et d'avoir recours à des modes de transport économes en énergie, comme le transport ferroviaire ou fluvial (ces modes de transport ne sont envisageables que pour transporter une quantité importante de marchandises). Danone, par exemple, a réduit ses émissions de carbone de 500 tonnes par an (Hénaff, 2011) grâce à l'initiative de mutualisation EMCA avec Carrefour et ID Logistics. Cette réduction s'explique par le recours au transport ferroviaire et par l'optimisation de la logistique (tant que Danone ne livrait que Carrefour, les quantités livrées ne permettaient pas le recours à ce type de transport).

3.2.2 Une logistique mutualisée, facteur d'économies d'énergie

La logistique mutualisée est une innovation qui concerne l'ensemble des services élémentaires d'approvisionnement. Au sein même de ce service, on peut distinguer un service d'intervention, un service de mise en présence et un service de mise en condition. Le service d'intervention, dans le cas présent, correspond au transport des marchandises et, éventuellement, aux opérations de chargement et déchargement de celles-ci. Le service de mise en condition se traduit

par la mise en condition des zones de stockage des marchandises (les entrepôts). Le service de mise en présence correspond, ici, uniquement aux déplacements des prestataires du service depuis leur domicile.

Le service d'intervention. La mutualisation des flux permet une augmentation des volumes transportés sur la phase de transport depuis l'usine ou sur la phase de transport vers les magasins (une caractéristique du service de transport). Pour ce service élémentaire, l'augmentation du volume transporté a des répercussions sur les modes de transport disponibles (une technique énergétique) : pour transporter des volumes importants il est envisageable d'avoir recours aux transports fluviaux ou ferroviaires, qui, rapportés à la tonne de marchandises transportée, sont des modes de transport moins consommateurs d'énergie que le transport routier. Si ces modes de transport ne sont pas envisageables et que le transport est réalisé par route, le volume de marchandises par camion peut aussi être optimisé (une méthode) pour réduire les consommations d'énergie par tonne de marchandises transportée. De la même façon, un plus gros volume de marchandises à distribuer offre une marge de manœuvre plus importante pour organiser des tournées (une méthode) et ainsi optimiser les distances à parcourir (une caractéristique de services) et les consommations d'énergie associées.

Le service de mise en condition. À l'exception de ceux qui accueillent les produits frais et surgelés, qui nécessitent du refroidissement, les entrepôts sont généralement faiblement consommateurs d'énergie car les services attendus sont limités (peu de besoin de chauffage ou d'éclairage, pas ou peu de process). La logistique mutualisée peut également permettre de réduire le nombre d'entrepôts et, donc, les consommations d'énergie globales associées. Cependant, l'augmentation du volume dans chaque entrepôt peut rendre intéressante l'automatisation de certaines manipulations, donc l'introduction de techniques consommatrices d'énergie.

Le service de mise en présence. Peu de changements sont à attendre pour le service de mise en présence, qui ne correspond, ici, qu'aux déplacements domicile-travail des prestataires de la logistique d'approvisionnement.

4 Conclusion

Maîtriser les consommations d'énergie se limite généralement à introduire des innovations technologiques, telles que des systèmes de chauffage, d'éclairage ou de ventilation innovants et énergétiquement performants. Mais d'autres formes d'innovations, non technologiques, peuvent aussi avoir des répercussions importantes sur les consommations d'énergie, à la baisse ou à la hausse. Cinq axes d'innovation peuvent être identifiés, du point de vue de leurs répercussions énergétiques : l'axe d'efficacité énergétique, l'axe d'enrichissement du service, l'axe de resserrement du service, l'axe de mutualisation et l'axe de délégation.

Dans le commerce de détail alimentaire, un certain nombre de dynamiques d'innovation et de changement ont des répercussions majeures sur les consommations d'énergie. Tout d'abord, les commerces mettent en œuvre un certain nombre de mesures pour maîtriser leur demande d'énergie. On peut citer, par exemple, l'amélioration de la performance des bâtiments (isolation, sas à l'entrée pour limiter les pertes thermiques, etc.) ou la fermeture progressive des meubles frigorifiques. D'autres dynamiques d'innovation, ensuite, ne visent pas la maîtrise de la demande d'énergie, tout en ayant des répercussions substantielles sur les consommations d'énergie. Ainsi, le développement d'offres de commerce simplifiées (le « drive » ou le commerce de proximité, par exemple), la diversification des canaux de distribution ou encore la mise en place d'une logistique d'approvisionnement mutualisée, modifient certains déterminants majeurs des consommations d'énergie des commerces, comme la surface de vente, la surface de stockage, les services périphériques proposés, la distance à parcourir pour l'approvisionnement des magasins et pour la collecte des produits par les clients, etc. Ces innovations relèvent, respectivement, du *resserrement*, de l'*enrichissement* et de la *mutualisation* des services, selon la terminologie que nous avons introduite.

Du fait de la hausse prévisible du coût des énergies dans les années à venir, la question de l'énergie ne peut plus être négligée lors de la mise en place d'un projet. Cependant, dans les bâtiments de commerce, elle n'est pas un facteur stratégique qui serait à l'origine d'innovations ou de changements majeurs. À organisation constante, des efforts sont consentis pour réduire les consommations d'énergie, mais la question des consommations d'énergie ne remet pas en cause un mode d'organisation choisi pour satisfaire la demande des clients. Le commerce ne se réinvente pas pour réduire ses consommations d'énergie, c'est avant tout la demande des clients qui guide l'innovation. Cependant, les questions énergétiques influencent la demande des clients et donc indirectement les tendances d'innovation dans le commerce de détail. En particulier, l'augmentation du coût des énergies fossiles peut inciter (voire contraindre) les clients à modifier leurs comportements d'achat, notamment les distances qu'ils parcourent pour faire leurs courses et la fréquence de celles-ci. Ainsi, par le biais de son influence sur la demande des clients, l'énergie peut indirectement devenir un enjeu stratégique pour l'évolution de l'activité commerciale. Par ailleurs, aujourd'hui, la demande des consommateurs favorise le développement de formes de commerce, comme le « drive » ou le commerce de proximité, permettant, globalement, des économies d'énergie.

Nous avons limité notre périmètre d'étude au commerce de détail alimentaire. Cependant, les dynamiques d'innovation et de changement de ce secteur peuvent avoir des répercussions directes, notamment sur le secteur du commerce non alimentaire. Aujourd'hui, si les consommateurs cherchent, par exemple, à consacrer le moins de temps possible à leurs achats alimentaires hebdomadaires, ils valorisent, au contraire, les achats non alimentaires, comme les loisirs ou les nouvelles technologies. La dynamique de développement d'offres simplifiées dans le commerce de détail alimentaire se traduit par un recentrage de l'offre sur les produits alimentaires, les produits non alimentaires étant, alors, vendus dans d'autres formats de magasins. Actuellement, l'activité des commerces non alimentaires est beaucoup plus

dynamique que celle des commerces alimentaires. Bien que les commerces non alimentaires soient moins consommateurs d'énergie, notamment par unité de surface, il serait intéressant, dans l'analyse des répercussions énergétiques des dynamiques d'innovation du commerce alimentaire, de prendre en compte ces effets secondaires.

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Engagement in service innovation: A case study of innovation of a tourism service

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FIRST DRAFT

Innovation theory, based in the ideas of Schumpeter, may tend to create a contradiction between innovation and stability. Yet, as it is well recognized, innovation is also about implementation, replication and realization of new elements. Furthermore, research in service innovation demonstrates that innovation can be ad hoc changes, rapid application of new ideas, a posteriori recognition of innovation and 'bricolage' (Gallouj and Weinstein, 1997; Toivonen et al., 2007; Fuglsang, 2010). These concepts indicate, at least implicitly, that innovation is a problem-solving activity that creates continuity between the past, the present and the future. We argue, based on a case study, that there is a need in research about service innovation, rather than analysing change as such and contrasting change with stability, to look for concepts that can bridge innovation and stabilization as two sides of the same coin. This paper uses the concept of engagement (Thévenot, 2001; Thévenot, 2007) to show, in a case study of service and experience innovation, how the development of new services and experiences may take place through different forms of innovative engagement with the world characterized by different forms stabilization and valuation.

1 Background

Innovation theory in the Schumpeterian tradition tends mostly to treat innovation as a dynamic process of 'creative destruction.' Innovation happens when economic agents create something new with prospective for economic development and when they break free of old economic practices. Following this, the literature has emphasised how novelty is created, realized and managed in practice. While this may, in fact, be interpreted as stabilization processes where actors seek to cope with the environment and its demands, the literature nevertheless tends to create a contradiction between innovation and stability. We argue, however, that there is a need to bridge innovation and stabilization as two related processes. For example, innovations can be interpreted as processes where innovative agents seek to relate new ideas to the demands of the environment by using known formats. Understood in this way, innovation and stabilization are not opposites but intertwined processes. Innovation implies a continuous attempt to coordinate ones activities with the environment by using formats which are recognizable and acceptable.

For the purpose of this paper we draw heavily of the ideas of Thévenot and his theory of engagement. Hence, Thévenot, in his work on engagement, seeks to analyse how actors cope dynamically with their environment by using certain established cognitive formats that enable coordination. Thévenot also argues that these cognitive formats represent a search for certain guaranteed goods:

I chose 'engagement' rather than a vocabulary of action or practice, as these focus attention exclusively on the human agent. My reasons were twofold. First, 'engagement' emphasizes the person's dependence on the environment she relies on while grasping it by means of a certain cognitive format. Second, the term refers to a quest for a guaranteed good (as in the engagements of marriage or a contract) that makes it possible to assess what is relevant to know (Thévenot, 2007: 415).

Thus, following the ideas of Thévenot, we argue that innovative agents must cope with the environment by using certain known cognitive formats of engagement. According to Thévenot (2001; 2007) three such cognitive formats or forms of engagement can be distinguished: familiar engagement, engagement into plan and engagement into justifiable action (see section 3).

The research question we more specifically address, based in the engagement theory of Thévenot, is how innovation becomes stabilized by such cognitive formats; we also explore whether higher levels of engagements are always needed for innovations to stabilize. For example, at the lower levels of engagement, innovations can be accepted within a familiar world that people are attached to through personal affinities and emotional ties. At the higher levels, there can be requirements of more explicit and codified plans in order for an emerging practice to be recognizable and acceptable.

The remainder of the paper is structured as follows. First we briefly review the literature on service innovation and its limitations in regards to a concept of stabilization. We argue that innovation and stabilization can be seen as intertwined processes by taking an engagement perspective on innovation. Then we present the analytical framework of Thévenot which we will use in a case study of innovation. Following this we present our method, case-study and findings. Finally, in the conclusion, we discuss the potential contribution to service innovation studies.

2 Innovation in services

There is no clear way to define innovation, but there is agreement that innovation involves the process of realizing an idea in practice. Sundbo defines innovation as "...the effort to develop an element that has already been invented, so that it has a practical-commercial use, and to gain the acceptance of this element" (Sundbo, 1998: 12). Hence, innovation is a process whereby an invention becomes adopted in a societal context. The invention does not need to be new to the world nor to the market, but can also be new in a given context.

Innovation in services can be interpreted in a rather broad way as behavioural developments as compared to technological developments (see for example Rubalcaba et al., 2012). Hence it concerns new behavioural forms of service that become accepted. Further, the literature on service innovation may be divided into at least two streams, which can be called 1) process and 2) systems views of innovation. The process views are mostly management oriented and the system views mostly policy oriented.

1. Process views of innovation: In the Schumpeterian tradition innovation is often seen as a process of 'creative destruction' (Schumpeter, 1947). Notions like radical/abrupt innovation, disruptive innovation or business model innovation (Chesbrough, 2010) stress forms of innovation that imply radical changes of economic behaviour with significant economic impacts at the firm level or at the societal economic level. However, it is also recognized in the literature that innovation is an evolutionary, cumulative activity (Pavitt, 1984), where history, experience and continuity matters. Varied evolutionary modes of innovation have been identified for example the 'science, technology and innovation' mode and the 'doing, using and interacting' mode (Jensen et al., 2007). Innovation has also been seen as an interactive process which is contextualized (Lundvall, 1992).

Research on innovation in services has identified several patterns of innovation relevant for different types of service companies, such as the stage gate model (Alam and Perry, 2002), which is a formalised phase model of innovation applicable mostly to large service companies. Less formalised incremental types of innovation have also been identified such as ad hoc innovation (Gallouj and Weinstein, 1997), rapid application innovation (Toivonen et al., 2007), a posteriori recognition of innovation (ibid.), or practice based approaches such as bricolage, i.e. solving problems on the spot by resources at hand (Fuglsang, 2010; Fuglsang and Sørensen, 2011; cf. also Baker and Nelson, 2005). Generally, service innovations are shown to be more incremental, less R&D-based and less formalised than innovation in manufacturing (Rubalcaba et al., 2012). The interaction of manager, employee and customer is shown to be important. The literature shows that innovation can be employee-driven but also management-guided (Fuglsang and Sundbo, 2005; Rubalcaba et al., 2012). Service innovation can be shown to be a problem-solving activity that creates continuity between the past, the present and the future. Even though service innovation research also stresses the role of the customer and customer-based innovation (Sundbo and Toivonen, 2011), it tends mostly to take a 'productionist' and managerial view on the customer and the service. Customer-orientation is based in the company/employees experience of, and capacity to deal with, customers.

Recent conceptualizations of innovation have, however, been developed by drawing on the conceptual framework of the Service-Dominant (S-D) Logic. This approach is inspired by the customer-oriented research stemming from the service marketing literature. This literature conceptualizes service as 'resource' developed for customers. Hence, in this view, a service innovation is a new resource made available for customers. This is different from the previous distinction between product and process innovation which otherwise dominates the innovation literature (Rubalcaba et al., 2012; Skålén et al., 2013). The value of a service is not seen as embedded in a service or product, but it is created through the customer's use of the resource. The provider's role as innovator is to make a new value proposition to the customer, yet it is the customer who creates the value by using the resource independent of, or in collaboration with, the provider. The literature focuses the firm, the customer and the interaction between them. Innovation becomes an intentional move towards creating a meaningful value proposition for a customer.

2. Systems views of innovation: The systems approach to innovation takes a macro-level, policy-oriented and functional approach to innovation. The purpose is to analyse and understand how varied policy measures and support structures at the societal level can influence innovation processes in companies (Edquist, 2005). Research identifies activities, functions or institutions at the societal level (national, regional, or sectorial) that influence innovation processes at the micro level. Innovation systems research has also understood innovation systems as interactive processes stressing that the relationships between government support activities and company level activities are interactive and emergent processes (Bergek et al., 2008; Hekkert et al., 2007). Furthermore, it has been argued that more historical, industrial specific and contextual models are needed (Asheim and Coenen, 2005; Cooke and Morgan, 1998; Miettinen, 2002; Sørensen, 2007). Hence the process and the systems approaches converge around a notion of innovation as a contextualized interactive process. Alternative approaches to innovation systems in service have suggested that they are loosely coupled systems (Sundbo and Gallouj, 2000) or problem-based systems (Tether and Metcalfe, 2004) emerging from practical problem solving around a particular challenge acting as a focal devise. Thus in the service-oriented literature, innovation system refers to the concrete interactions of actors at the micro-level forming a practice rather than to the wider societal support structure. An even stronger convergence of system and process views we find in the Service-Dominant (S-D) logic (the service marketing literature) where system is defined as interaction of resources: "A service system is an arrangement of resources (including people, technology, information, etc.) connected to other systems by value propositions" (Vargo et al., 2008: 149).

Overall, including both process and systems views, both the classical ‘productionist’ service innovation literature and the ‘customerist’ service marketing literature tend to neglect that the provider and the customer may at least in some cases be seen as embedded in a common context. The literature mostly stresses that providers and customers belong to different systems or different spheres (Grönroos and Voima, 2013). Thus, a main problem in the literature is perhaps the relatively sharp distinction which is often made between provider and customer sphere and the subsequent ‘interactionist’ view of them, at least if interaction here means an isolated and conscious relation between a provider and a customer (see also Heinonen et al., 2013).

Rather than focusing the value-in-exchange (the provider sphere) or the value-in-use (the customer sphere), and the interaction between them, an engagement-oriented view would shift attention towards the common cognitive formats through which the innovations are presented and actors are engaged. For example, in the case of downhill cycling (the example of this paper) users, producers, volunteers and others become engaged in a familiar environment with common maintenance gatherings and construction of trails. It is not possible to maintain a sharp distinction between provider-sphere and customer-sphere. Rather than merely having a relationship with one another as provider and customer, actors are also engaged in mutually affirming the value of the practice-world under formation by referring to certain forms of engagement. The advantage of such a view would be to better understand how innovation is stabilized by certain cognitive formats rather than it is disrupting a practice. We hold that producers and users are engaged in stabilizing the value of an innovation by means of certain engagement strategies.

3 Engagement

Thévenot understands engagement as a relation between a human agent and the environment (Thévenot, 2001; Thévenot, 2007) in which the agent moves between a personalized conception of the world and a more generalized conception of the world. For example, in a service context, a company or person can give customers access to a unique personalized environment. But the service provider can also try to depersonalise the service by organizing it in accordance with certain standardized themes and conventions thereby adapting the value proposition to more to established codes and standards. Furthermore, in some cases this can be done in an even more general way with reference to the societal values the service offer is supposed to create, such as contributing to local and regional development. At centre of interest is here the format of engagement rather than the content of the engagement, as well as the goods it produces for the actors.

Thévenot makes a distinction between three types of engagement, familiar engagement, engagement in plan and engagement in justifiable action. Familiar engagement is when people relate to their environment by organizing it in a personalized way. Such a personalized environment is a bricolage of all kinds of things that have been accumulated and accommodated over time in a way that people become comfortable and at ease with them. The objects are not carved out in a very precise way with a specific purpose in mind, and the relation to them is almost tacit and emotional. The relation to the environment is two-sided as it is characterised both by a kind comfort with routines and also inquietude and distrust when the comfort disappears. Further, things are not organized according to explicit principles but by trial-and-error processes where actors incrementally learn how to organize them in a comfortable way according to personal and bodily needs. Thévenot compares this regime of engagement to ‘inhabiting a home’. How we live at home is difficult to account for because everything is organized in a very personalized way.

Engagement in plan, or in regular action, is engagement in the environment according to a specific plan or project. The plan or project represents an individual person who projects herself into the future. The inherent good is construction of individual autonomy. This is also what Thévenot calls conventional utility, because the plan relies on certain conventions and represents an investment in form. Engagement in plan makes it possible to coordinate actions between actors that are not present at the same time (Duymedjian and Ruling, 2010). Functions, roles, actions, purposes become specified, the disadvantage being that details are lost. Thévenot compares this to someone who wants to rent her apartment to another person and has to reorder her home according to conventions to make it functional and recognizable for another person. Engagement in plan is a framework for ‘normal’ effective and intentional action.

Engagement in justifiable action is actors’ attempts to critique, argue for and justify certain actions and conventions in terms of the societal/collective values they are supposed to produce. This may be triggered by a dispute, for example over a rented house. The tenant of the house questions whether it is in a proper state. The landlord then needs to justify how things have been made. For example, the house that seems in a bad shape can be justified in terms of efficiency, safety, market price, of patrimony (Thévenot, 2001), or in terms of local conventions.

These different forms of engagement can be seen as different degrees of extension of the agents into the environment or different degrees of disengagement from what is most personalized. They are different cognitive frameworks, more or less generalisable or institutionalized, through which people can open themselves towards the environment, coordinate action and attach certain meanings and values to it. For the purpose of this paper, it is suggested that the engagement approach can be used to explain how the value of a service innovation becomes framed and stabilized by agents engagement in a practice.

4 Method

The method is a case study of Hafjell bike park in Norway. The bike park known for downhill cycling. The case study method is relevant when the researcher wants to collect contextual experience about a phenomenon (Flyvbjerg, 2001) and when the boundaries of the phenomenon are not very clear (Yin, 2003). The intertwining of innovation and stabilization is a phenomenon which is until now analytically not very clear. Further, we argue that downhill cycling in Hafjell is an extreme case. Extreme cases (Flyvbjerg, 2006) "often reveal more information because they activate more actors and more basic mechanisms in the situation studied" (p. 229). The development of Hafjell Bike park, can be seen as an extreme case for several reasons. First, the growth has been extreme: From starting on scratch 13 years ago, digging the first bike track with bare hands, to host the World Championships 2014 with 1900 participants and 40.000 expected spectators. Second, Hafjell bike park is a great success both nationally as internationally. It is unique, because it is the only ski destination in Norway which has been able to build a sustainable downhill product generating profit. Third, Hafjell has overcome great challenges in justifying its relevance vis-à-vis the municipality and local landowners. In addition, it is a case relying largely on personal engagement of the core actors. The case study was selected by a strategic choice method by the following criteria: It should be possible to define it as a practice, the practice should represent an innovation and it should also be possible to recognize struggles of stabilizing the innovation. Downhill cycling can be defined as a practice i.e. a coherent cooperative human activity (MacIntyre, 1985: 187) which is relatively stable in time and socially recognized (Gherardi, 2006: 24). It is an innovation because the case further develops downhill cycling in a unique way. This represents an innovation in itself which consists of many small ad hoc and bricolage innovations. Finally it has been possible to recognize struggles of value stabilization during the innovation process as it shall be further explained in the section on findings.

Downhill cycling is a fairly recent practice still under development. It is a sports activity which is carried out in the mountains using a special type of mountain bike, security equipment, bike trails, and turns and hops that are constructed in the mountains by using a spade or an excavator. The activity is carried out by highly trained cyclists as an elite sport, but also as an amateur family activity much like downhill skiing. As an elite sport, it has its special tournaments such as the Norwegian championship, the Nordic championship, European championship, the World championship and the European cup.

The method of data gathering and analysis used in the study, is a narrative of a single case study. The narrative is based on 1) in depth retrospective interviews with the key innovators of the experience services, 2) long term observations of one of the authors, and 3) documentary materials.

The retrospective interviews where with five informants who represents the key players in the development of Hafjell bike park. In addition, one of the authors has worked in close relations to Hafjell bike park in all the development years. Her observations and intimate understanding made it possible to write the full story narrative which has then been checked and revised against the taped interviews by the other author. The 5 key players are: Geir, Head manager of Hafjell and the man who started the initiative of cycling and summer operation at Hafjell. Snorre, a local bike enthusiast and also a former skeleton and bob driver on the Norwegian team. Snorre and some friends started digging bike tracks for fun secretly in Hafjell. Later Snorre became the department manager of summer and bike activities at Hafjell. Kjell Tore, a local restaurant owner in Hafjell who had an idea of bike arrangements generating more traffic to his restaurants during summertime. Knut, a Norwegian downhill biker on world cup level who lives and works at Hafjell. Ole, head manager of Hafjell after Geir.

The paper presents a condensed version of the full narrative. The version highlights and explains key events of the case shedding light on our perspective of understanding innovation and stabilization of its value in group practice. We have codified the data based in our interpretation of the data and our interpretation of the three types of engagement mentioned by Thévenot. In principle, other forms of engagement may be found as well. The interpretation of data draws on the Flanagan critical incident technique (Flanagan, 1954), yet by studying 'events, processes and issues' related to specific problems (Chell, 1998: 68) we work with a broader and more phenomenological approach to critical events of the narrative.

5 Findings

In the following we present our findings in the form of a brief narrative which has been codified by means of the three concepts of engagement : familiar engagement, engagement in plan and engagement in justifiable action. The critical events are listed and further explained. We outline the types of values around which the innovation becomes stabilized in each engagement type. In the case study, the development of the whole bike park is seen as an innovation in itself, but it entails a number of ad hoc innovations, incremental innovations and bricolage innovations that emerge throughout the different strategies of engagement. In this way, innovation and engagement are intertwined processes.

Familiar engagement

1. Geir, leader of Hafjell, is experimenting with downhill cycling.
2. One day he meets Snorre in Salt Lake City.
3. Snorre is also experimenting with downhill biking.
4. Well it turns out: he is digging cycling routes in Hafjell (in secrecy), where Geir is leader!

When downhill cycling was developed at Hafjell, it was initially based in a personalized and familiar engagement in developing the practice. It was carried out without much explicit plan and under the radar of the formal bodies of Hafjell.

Geir was head manager of Hafjell Alpine Centre AS during the years 2003-2009. He had a passion for snow, snow production, slope construction and preparation of slopes. He travelled with his core staff to get inspiration from the world's largest ski resorts. Geir had a fascination for the summer bike activities in the largest ski resorts. He started to believe that ski resorts had to develop summer activities if they wanted to survive and remain competitive.

Geir visits Salt Lake during the Olympics in 2002 and accidentally meets the Norwegian skeleton participant Snorre. Geir explains his fascination with the bike trails they have built in Salt Lake City. Snorre listens closely because he, on top of his skeleton career, is an active biker. Since he was a child he has built hops, turns, and runs in the woods for biking. Snorre tells Geir about his hometown in Norway, and how he and some friends are digging bike trails without permission in the local ski resort. It turns out, to the surprise of both, that Snorre is digging the bike trails in the very alpine centre where Geir is the head manager!

Geir eventually hires Snorre to develop trails in the mountain. Geir understands quickly that he does not have the support from the Board of Hafjell. This means that Geir, in the beginning, secretly allows Snorre to dig trails up in the woods. Geir convinces the Board that the chair lift can be a great summer attraction for tourists and the Board agrees to a limited number of summer day operation in 2003. Secretly, Snorre and Geir build unique custom racks mounted on the chairs to transport bikes to the mountain. This makes it possible to sell day passes to downhill bikers during the summer season.

The overall innovation of Hafjell Bike Park itself starts with both Snorre's and Geir's personal and familiar engagement. Their engagements become soon intertwined and are followed up by several smaller innovations (more ad hoc, incremental and bricolage innovations). Geir allowing Snorre in secrecy to build in the woods pushes the motivation of Snorre to a more innovative and experimental development of tracks. Their cooperative engagement also leads to the development of purpose-built racks for transporting bikes with chair lift. It appears clearly in the case how engagement and innovation are intertwined processes.

Value stabilization: At the initial stage of the innovation process, the value of the innovation is affirmed by mutual praise and enthusiasm of the two core persons when they express to each other their confidence, ease and fascination of downhill cycling. The internal value is sedimented around the joy and fun of biking, the bodily knowledge and skills of Snorre who can easily build tracks that he is confident with due to the skills he has developed since childhood, and the secret prospect of developing downhill cycling into a summer activity. However, this value appraisal has some limitations and sacrifices. Firstly, the two core persons, without the support of the Board, have very limited resources and limited autonomy to act. Further, they are in deep trouble vis-à-vis the Board and other stakeholders in the area to whom they have still not explained what they are up to.

Engagement in plan

1. Kjell Tore, a restaurant manager, seeks out Geir, he would like to arrange downhill cycling competition. He wants to have more summer tourists.
2. Geir says Snorre already has started digging trails in the mountain on his own initiative; maybe they should meet.
3. They form a project and a project group.
4. They start to formulate visions for the future.
5. They arrange the Norwegian Championships. With the help of friends and acquaintances.
6. They use social media and a new media agency for inexpensive marketing
7. They arrange World Cups and eventually the World Championship

As they proceed in developing the downhill cycling at Hafjell, Geir and Snorre become more future-oriented and more engaged in plans. Yet, to some extent they must still rely on a familiar engagement using available family members and friends who can easily be recruited as staff and with whom they are at ease.

The engagement in plan takes off when Kjell Tore, a local restaurant manager, contacts Geir for a meeting. Kjell Tore struggles to get people to the restaurants during the summer. He needs more action in the destination and more activities that encourage people to visit Hafjell in the summertime. He has an idea that he wants to discuss with Geir. Kjell Tore has done a brilliant preparation for the meeting, and he presents a total packet of a complete bike-arrangement appealing to both experienced bikers, families with children and tourists. Based on his experiences from arranging ski competitions and thorough research on what it requires to arrange bike events, he manages to convince Geir that his idea is workable, and Geir answers:

This is interesting! This I wants to go ahead with, but first you need to meet someone. His name is Snorre Pedersen, and he uses a little bit different tactic than you do! He is digging biking tracks up here without permission!

Geir arranges a meeting between Snorre, Kjell Tore and himself. The beginning of a strong triangle corporation is born. Geir has a dream of Hafjell as a year-round destination offering year-round working places to the core staff. Kjell Tore

has a dream of hosting major events that cause people flocking to Hafjell. Snorre has a dream of building some of the world's best downhill biking tracks and one day be able to host the world's best cyclists. Three visions fitting into an overall vision! The meeting turns out to be the beginning of an exciting collaboration that will result in Hafjell emerging as one of several leading down hill destinations in the world.

Snorre and Kjell Tore manages together to motivate a local bicycle environment to engage in voluntary work for Hafjell. In addition Kjell Tore creates a local downhill bicycle club. Geir also highlights that Hafjell has a crucial role in relation to the local community and points out that the reputation effects are at least as valuable as income. Hafjell has a responsibility in regional development. Despite this, it is still 3- 5 years before Geir gets the board on his side and a green light to further investment in summer operations.

Kjell Tore uses the first two years to test different bike competition concepts, and then he specializes into downhill competitions, beginning with Norway Cups. The first years they are only allowed to use one of the chair lifts and the upper part of the alpine centre due to landowners. After several successful Norway Cup events under this chairlift, Hafjell applies for and gets, in 2006, responsibility for arranging the Norwegian Championships. The following year they arrange the Nordic Championships. According to Kjell Tore this is possible because of the strong partnership between Geir, Snorre and himself. They have all the decision power in their hands. Kjell Tore continues to push on to new challenges, and after the Nordic Championship, he proposes: "Should we try to apply for European Championships?" All agrees to give it a try and Kjell Tore initiates an application process. To everyone's surprise, Hafjell assigns the European Championships to Hafjell in 2010.

Snorre is also committed to making Hafjell bike park a leader in web and social media. Therefore, he is working hard to make specific parts of the trails perfectly ideal for photo-shoots. They remove trees for better views and sore grass to promote lushness and colour on the pictures. Snorre emphasizes the importance of both photos and movies to tell how wonderful the trails in Hafjell are. Hafjell bike park also initiates a corporation with a newly founded company, Anti Media, working with both pictures and movies. One of the people in the Anti Media comes from the bike community and expertise combination leads to fantastic film material from Hafjell shared actively on Facebook. Photos and film show not only intense cycling at a high level, but also beginners, children and adults experiencing the bike park.

For several years during the event work, Kjell Tore builds the event staff with the help from friends, acquaintances and volunteers. It becomes more and more challenging along with the larger events, to recruit enough staff. The long road of preparation and hard work towards the European Championships commences. Kjell Tore applies for financial support from the municipality, the county council and other public bodies, but the applications are all turned down. This means that Kjell Tore is forced to build his event committee and official group of friends and volunteers. An extensive and arduous task meets everyone involved; they become very exhausted during the process. However, the European Championships is seen as a great success. 210 minutes of television coverage in 70 countries finally means that they have the attention of the municipality and the local public. Suddenly it becomes of major focus and interest to expose what has been achieved at Hafjell. However, Geir has now quit his job as head manager in Hafjell because of internal conflicts. This is a huge problem for Kjell Tore and Snorre. They evaluate whether or not they should to proceed. Kjell Tore is not used to say stop, and he suggests "We can apply for a World Cup event and consider the situation if we get it." This is of course what they do, and then they get it. The World Cup Final 2012 has to be arranged by Hafjell:

Everything up to this point was built on pure will, interests and volunteering from those who participated. No one got paid anything. For so many years, everything was built on volunteerism and volunteer! It had to end eventually. Arrangements had become so large that it was not enough with my family, my friends, family of Snorre and friends of Snorre! We needed 100s of officials, so we should move on to get professionalized!

During the period in which they apply for financial support, the international cycling association (ICA) calls Kjell. He is confronted with the most unexpected question: "Will you take upon you to host the World Championships in 2014?" Kjell Tore does not believe what he hears. Normally there is an extensive process to apply for world Championships and many destinations are mutually fighting to get the event. The ICA argues. "Hafjell has absolutely ideal facility for our events. We get massive praise from all participants who have been to Hafjell. The compact arena is perfect and close to both the accommodation, bike repair, and all it takes. Hafjell is perfect for the athletes." They end up with a "yes" to both the World Cup finals in 2012/2013 and the World Championship in 2014. Since Geir has quit Hafjell, Kjell Tore is now very careful in putting in place all relevant contracts with Hafjell for the arrangements.

Three visions based on familiar engagement, or three innovative ideas, fitting into an overall vision, illustrates how engagement and innovation becomes intertwined. The case shows how the actors are forced to engage into plans to push the development further if they want to succeed with their visions. The engagement into plan then again leads to new smaller innovations such as the creation of a local bicycle environment, cooperation with anti-media, and the development of facebook as a marketing tool.

Value stabilization: Engagement in plans means a more visionary, open and future-oriented approach with specific events to be organized which are recognized by the Board and the local community. The advantage is more visibility, recognition and autonomy to act. The engagement in plan is affirmed also by the practitioners on Facebook, among others, which is at the same time an effective and inexpensive channel for marketing. These future-oriented engagement strategies for Hafjell include the following statements: "So sick, must visit next season." "Thanks for the awesome time

did we spent last summer. It was one of the amazing times of year.” “Best park in Europe!!!” “Full credit to the builders for such awesome tracks.” “Well deserved Snorre! You and the guys are doing some great work.” And Snorre responds: “Wow! Big words guys! Thank you so much! Hope to see you here soon Chris. Absolute honor to work with you!”. There is, however, still a limitation and sacrifice of this enthusiastic engagement into such visionary future-oriented plans, namely that they are badly coordinated with stakeholders in the local community; the plans are not very well justified in relation to some of the local stakeholders.

Engagement in justifiable action

1. They have problems with landowners.
2. They have problems with the hospital and the municipality.
3. They have problems with Hafjell.

Eventually, Hafjell downhill cycling must justify itself in relation at least three local stakeholders: the landowners, the local hospital and a new management at Hafjell.

The landowners: In Norway, there are no restrictions on trail construction in the nature, as long as landowners have approved the project. This is quite different from other countries such as New Zealand, where it is quite inconceivable to be allowed to build similar bike trails as in Hafjell. This means that Norwegian destinations have significantly better conditions for building downhill trails than destinations in other countries. The only barrier is the consent from landowners. Geir was not always putting in place contracts and agreements before he acted. This creates challenges in relation to landowners for Snorre during the years. Some owners became strongly opposed to trail building on their ground, mostly because they were not well enough informed and had not been allowed to consent to action. When Geir ends his career, Snorre has to make a thorough cleaning job of contracts. He must make good contacts and communications with all landowners. In particular, one landowner has over the years been difficult to work with for Hafjell. Precisely this landowner appreciate in particular the close follow-up after Snorre’s cleaning, and turns perfectly round to be the one offering Hafjell to borrow equipment for trail maintenance.

The hospital: Downhill biking is an action sport, which means that there is always a risk of bad injuries. Different from many ski/bike destinations Hafjell has only 17 km to the nearest hospital, Lillehammer hospital, managing acute care, ambulance and helicopter. When serious injuries occur, competent medical help is only 10 minutes away. In spite of the hospital close by, Hafjell has, as the only bike destination in Norway, chosen to have bicycle patrols as well, corresponding to ski patrolling in winter. Snorre says that they have been very careful recruiting employees to the bike patrol. They have employed many who also work in the ambulance in Lillehammer. This is to get maximum possible expertise in damages, but also to create a good working relationship with the hospital. Snorre tells that Lillehammer hospital is divided in its attitude to the bike park! Some of the staff at the hospital are very upset with the damage coming in because of Hafjell. Meanwhile, others who know the bike park or work there praise the safety. Snorre and the bike park have several times invited the ambulance service staff to cycling and guiding in Hafjell. The guidance has then included inspection of the security conditions and access paths to injuries in the bike trails.

The new management at Hafjell: A new era starts at Hafjell when Ole is employed as the general manager to replace Geir. Ole has previously been recruited to several former companies for just cleaning up the finance and accounting. Ole is a figures’ man and he communicates through Excel and his accounting system. He has expertise from manufacturing and the power industry, but no knowledge and competences from ski resort operation! He constructs accounts that can demonstrate whether or not the bike park is capable of being break-even.

It is a challenge for the bike park that other concerned actors, such as the landowners and the local hospital that are not part of their familiar entourage, are initially more or less ignored. The personal and familiar engagement into the design of trails, slopes and hops leaves little attention to the other concerned actors and their varied needs and engagements. This lack of consideration leads to conflicts about the bike park. A language of dialogue and justification is needed in order to restore the relations. When Snorre starts to show more interest in the landowners’ rights, as well as Ole’s reasons for using a spreadsheet, positive relations across varied familiar engagements are created through mutual respect and justification.

Value stabilization: Hafjell bike park is required to justify its activities to the relevant stakeholders in the community. It must be argued in a publically acceptable way how this activity can be relevant in a societal context. Value has to be stabilized in dialogue with landowners, the municipality and the Hafjell management around the issues of property right, security and breaking-even also in order to show respect towards other agents familiar and personal engagements.

6 Conclusion

The paper used the concept of engagement (Thévenot 2001; 2007) to show, in a case study of service and experience innovation, how the development of new services and experiences may take place through different forms of innovative engagement with the environment. Actors relate to their environment through different cognitive formats by means of which they dynamically seek to adjust and stabilize the innovations. Three forms of engagement were distinguished based on Thévenot: familiar engagement, engagement in plan and engagement in justification.

In the case study the innovators, at least in the first stages of innovation, tended to take a familiar and personalized approach to their environment; but the sacrifice of this was lack of autonomy. In order to stabilize the value of the innovation in a wider context they eventually became more involved in plans and justifiable actions. This also helped them to negotiate the innovation in relation to outsiders with whom they did not share familiarity. The case study shows how varied types of engagement support each other. It also shows the key role of familiar engagement for service innovation where actors grasp the environment by means of what is familiar and emotionally acceptable.

The contribution to research on service innovation lies in the attempt to see innovation as dependent on varied cognitive formats of engagement. Further, from the case-study it appears that lower levels of engagement are important in the beginning of the innovation process while more highly institutionalized cognitive formats can be important at later stages. To innovate, the actors appear to develop a familiar relation to the environment and the resources at hand; yet they must also be able to develop plans and argue for their cause using a language of dialogue and justification.

The engagement approach is different from the interactionist approach that tends to dominate innovation research. This approach often stresses the interaction between providers and customers as well as their different value-orientations (value-in-exchange and value-in-use). Instead we have suggested that actors are oriented towards varied cognitive formats of engagement. Innovations become dynamically stabilized by using these formats of engagement. Hence, in this approach, it is the relation between agents and their environments as mediated by cognitive formats which is the basic analytical model.

Focusing engagement rather than interaction should lead to questions of how varied cognitive formats impact innovation. Sometimes it is assumed that highly institutionalised and formalized formats are preferable to more familiar forms. However, actors also need to feel in control of the resources and need to be able to activate them in a more personalised way in order to solve problems. The advantage of this approach is firstly that it becomes clearer what the impact of various cognitive formats can be on innovation, hence it has consequences for innovation management research. Secondly, it makes it possible to explore some potential links between social institutions, in the shape of cognitive formats, and innovation.

Compared to the marketing theory of value-in-use, the engagement approach tends to re-introduce a 'productionist', employee- and management-oriented view on service innovation. The agents are those who create innovations. However, in the engagement approach, innovation is not viewed only as linked to service providers in a narrow sense. Rather, the context of innovation is one of engagement, where agency can be undertaken by many types of actors including providers, users, volunteers etc. Unlike the marketing literature, this approach does not focus the value-in-use, but how value is approached and negotiated in a wider social context of engagement.

Future research could make comparative studies of the impact of cognitive formats on innovation in different contexts. Different cognitive formats may dominate in different industry sectors for example. Future research can also explore how a engagement-oriented approach can be combined with quantitative studies of innovation in services. The impact of cognitive formats on innovation may be explored in a more statistical and quantitative way.

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The Role of Small Towns for Surrounding Rural Development: The Case of Metema Town, North West Ethiopia

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There is a growing need to identify the most appropriate mechanisms through which to stimulate economic activity across a broad range of economic sectors in rural areas. One strategy is to use small towns as 'sub-poles' in rural economic development but the effectiveness of such a strategy depends not only on the size of the various multipliers but their spatial distribution. The potential value of a town as a 'sub-pole' in local economic development is shown to be dependent on structural differences in the local economy, such as the particular mix of firms within towns. An operational framework is described which aims to examine the sectoral and locational variations which may affect the success of any small town sub-pole strategy, using some developed empirical tools to measure economic linkages. It then goes on assessing the potential role of small and mediums-sized towns as sub-poles in rural development. The paper concludes with some suggestions for future research in this field

Keywords: Small Towns; Rural Development; Sub Pole; Regional Development, Metema

1 Introduction

Small towns are increasingly being perceived as a possible focus for initiatives that seek to maintain or enhance the rural economy. The ability of small towns to generate economic growth in rural areas depends on the nature and strength of the linkages between the town and its surrounding hinterland (and vice versa). These are determined by the extent to which: Hinterland households earn income in the towns; Town households spend income in the hinterlands; and Town businesses source inputs (labour and goods and services) in the hinterlands.

These linkages work in both directions. Small towns and their surrounding rural areas are part of the same functional economic system and, as a result, numerous different types of economic linkages exist between them. A farmer may rely on neighboring towns for agricultural inputs, shopping, schools, healthcare and farm labour. A resident in a small town may use the rural hinterland for recreation and as a source of local food while a town employee may choose to live in the surrounding rural area and commute to work.

As a result of these links, small towns form an important component of rural economy and society. Increasingly they are being perceived as a possible focus for initiatives that seek to maintain or enhance the well being of rural areas as a whole.

From a rural development perspective, the spatial distribution of linkages between a small town and its hinterland is just as important as their size. Tacoli C. (1998) has shown that the economic footprint of different types of firms and different types of households vary. For instance, small firms tend to be more locally integrated than larger firms; retirees tend to spend a higher proportion of their income locally than single adults with no dependants. At another level, the relationship between small towns within a region can influence development trajectories. Urban-Rural relations, emphasize the potential for reducing inequalities between areas by pursuing polycentric objectives. In other words by developing complementary roles for adjacent small towns, overall rural development can be enhanced. This is likely to be particularly important in more remote rural areas (MoFED 2006):

Spatially tracking the nature of linkages between town and countryside and considering the nature of economic relations between small towns adds considerably to current understanding of spatial development in rural areas.

1.2 Statement of the Problem

Small towns are potentially attractive as a focus for future rural development initiatives for a number of reasons. In the first place, they may provide the opportunity to foster beneficial economic development while conserving the environmental assets of the open countryside, confining new built development to existing urban settlements and reducing the need for the town's residents to commute to work elsewhere. Second, they may already contain the concentrations of community and institutional capacity necessary to manage local, regional or national initiatives in a reliable and accountable manner. Finally, the concentration of rural economic development initiatives in small towns may take advantage of economic advantages of population clusters while allowing the benefits (in terms of both employment and income) to spread out to the surrounding countryside.

In the Ethiopian context, questions that need responses are many. Plan for Accelerated Sustainable Development to End Poverty (PASDEP), in its fourth pillar which promotes small town development motivates rural-urban linkage (MoFED, 2002; 2006). However, there are no sufficient studies on small towns as sub-poles for rural development. Such study will provide a general perspective on the role of small towns in attaining over all development. Hence, this

study attempts to fill this gap focusing on small towns' role on surrounding rural areas development. Several lessons can be drawn from this study, such as, factors that affect rural-urban interaction between small towns and their rural hinterlands; the current forms and magnitudes of rural-urban interaction, and the services and facilities provided by small towns. The Answers to these questions and others will help to enhance rural-urban interactions and the role played by small towns for sustainable and mutual development of urban and rural areas.

1.3 Objectives of the Research

1.3.1 General objective

The General objective of this research is to analyze the role of small towns for the development surrounding rural areas.

1.3.2 Specific Objectives

The specific objectives of this research are to 1) Examine the different types of economic linkages that exist between Metema town and its surrounding rural areas. 2) Measure the strength of economic integration between Metema town and its hinterland. 3) Evaluate the potential value of Metema town as a 'sub-pole' in local economic development. 4) Identify of the social, cultural, and multiplier effects of investing in small towns and hinterlands. 5) Discuss the policy implications of the results.

1.4 Research Questions

In rural-urban interactions study, a range of physical, economic and service linkages have to be examined. As Rondenilli and Evans (1983) stated cited by Demeke (1998:5), some of these are transport links, production and marketing links, the delivery of social services (health, education), technological linkages related with energy and communication, and public administration linkages.

Based on these concepts and the objectives forwarded above for the study, the following research questions are formulated. 1) What are the factors that affect rural-urban interaction between small towns and surrounding rural areas? 2) What are the major non-farm activities undertaken by farm households in the hinterlands of small towns? And what roles do they play in promoting rural-urban linkage? 3) To what extent do rural households use agricultural inputs? From where do they obtain these inputs? 4) To what extent do small towns depend on their rural hinterlands for agricultural produce consumption, labor and trading activities?

1.5. Research Methodology

1.5.1. Data Sources and Sample Size

1.5.1.1 Data sources

In order to conduct this research and to identify the different types of linkages data was collected from both primary and secondary sources. In the collection of primary data, questionnaire and personal observations was conducted in sample rural and urban areas and interviews will also be conducted with responsible personnel's of corresponding woreda agricultural and rural development offices of Metema woreda and municipality of Metema town.

Three sets of questionnaire pertaining to rural households, urban households and traders was prepared. The questions included in the questionnaire are related to linkages of consumption, production, and service provision in addition to socio economic characteristics such as demography, land holding and others that helps for the explanation of the phenomena.

The secondary data were derived from relevant organizations such as CSA, Woreda agricultural office, Amhara Region Bureau of Agriculture (ARBoA), Zonal planning offices, Municipality of the sample Metema town and others.

1.5.1.2 Sample Plan and Size

A two stage sampling design was used in the data collection. For the rural households, two rural kebeles with in a 10 km radius from the town were selected randomly in the first stage. The roasters of peasant associations were used as sampling frame. Similarly from two kebeles of Metema town two kebeles of the town were selected purposively. The urban kebele administration was used as a sampling frame. Formulas often used in most social science researches for sample size determination when the target population is less than 10,000. Yamane (1967:886) provides a simplified formula to calculate sample sizes.

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n- is the sample size and

N- is the population size.

e- is the level of precision (confidence)

Substituting the value of N in the above formula the actual sample household number are calculated for both urban (where N = 11,118) and rural (where N = 69,428). The method results a sample size of 347 and 56 urban and rural households respectively. However, out of 56 urban sample households, 40 valid samples (30 urban households and 10 traders) were entered in to the analysis. Likewise, out of 347 rural sample households, 315 valid samples were entered in to the analysis. The remaining samples (16 urban sample households and 32 rural sample households) are accounted to be unacceptable because enumerators missed pertinent variables at the time of data collection and it was not viable to make an interview for the second time due to time and money constraints.

Besides, the researcher believes that such insignificant number will not have any major effect on the results of the study. Number of sample households in each kebele was determined as per of the proportion to the population size and samples are drawn using systematic sampling method.

1.5.2 Method of Data Analysis.

In the analysis of the data, both quantitative and qualitative methods will be used to examine the existing rural-urban linkage and its implications in the role of small towns in rural development. Quantitatively simple statistical tools such as percentages, means, standard deviation, charts, chi-square and ANOVA were used. The qualitative part includes analysis of attitudes, opinions, and suggestion of informants.

2 Factors Affecting Rural-Urban Interaction for development

The factors that affect linkages between rural and urban areas are various. Among other things, some of them are Agriculture research and Development, Information and communication technologies, Infrastructure development and market institutions (VonBroun, 2007; UN/FIG, 2004; UNDP, 2000; Tegegne, 2005; Ellis and Harris, 2004; Fan S. et al., 2005; Douglass, 1998; Eshetu, 2007; Mohammed, 2005).

Science and technology are fundamental for rural-urban linkages and in this context Agriculture Research is fundamental. The Green Revolution experience which include high-yielding varieties complemented with irrigation and intensive fertilizer use especially in Asia has shown that research and development can result in technological breakthrough that enable considerable improvement in agricultural growth, which in turn can translate into substantial rural development and poverty reduction (VonBroun, 2007:11).

Information and communication technologies can lower transaction cost by reducing information bottlenecks that hinder rural-urban linkage and by increasing search, screening and bargaining costs. Information Communication Technologies opening-up market possibilities for rural inhabitants (VonBroun, 2007:12; UN/FIG, 2004:3).

Infrastructure works as a bridge between the rural and urban world, and between agricultural sector and other sectors of the economy. In addition to direct impact, infrastructure may indirectly affect rural and urban linkages (VonBroun, 2007:12; UN/FIG, 2004:3; Ellis and Harris, 2004:2).

In developing countries, particularly low income ones, market failures such as deficiencies in information and lack of regulation and legal enforcement mechanisms persist and restrict the level of trade between urban and rural areas. Local rural-urban linkages can vary according to the larger spatial networks of towns, cities, transformation and communication flows (Dauglass, 1998:15; VonBroun, 2007:15).

Rural-Urban interaction is affected by economic situation and budget cutbacks. One of the marked distinctions between rural and urban areas in developing countries is consumption expenditure (UNDP, 2000:17). Strengthening rural-urban interaction without a capacity of rural areas to capture the upstream (providing inputs) and downstream (processing and marketing) activities associated with natural resource extraction and flows will only perpetuate low incomes (Ellis F. and Biggs S.(2001); UNDP, 2000:28).

There are regional differences in rural-urban interaction. In Nigeria the linkages are stronger in the southwest and the eastern region than in the northern region (UNDP, 2000:16). Differentials in physical development can be partly traced to this unequal rural-urban linkage between parts of the north and the south. Regions that had stronger rural-urban interaction have lower poverty level as compared to the areas, which had weaker linkages.

Moreover, socio-economic relations, structure of the rural economy, natural environment, and resources, rural production regimes process and pattern of urbanization, lack of balance rural-urban policy, land tenure and size are also factors determining rural-urban linkage (Dauglass, 1998, 1999:15–16; Tegegne, 2005:157–159; Demeke, 1998:24–25; Eshetu, 2007:22; Mohammed, 2005).

3 Background of the Study Area

3.1 Location

Metema woreda is one of the woredas in North Gondar administrative zone of Amhara National Regional State. It is the largest woreda in the zone. The woreda is divided in to twenty two administrative kebeles. Two of the kebeles are found in the woreda capital, while the rest are rural kebeles. The woreda is bounded by Tacharmachiho woreda in the North, Chilga woreda in the East, Quara woreda in the South and Sudan in the West (see map below).

The study was conducted in Metema woreda of the Amhara National Regional State (ANRS).

Metema is located at about 900 km Northwest of Addis Ababa and about 180 km West of Gondar town. Metema is one of the West most Woredas of the Amhara Regional State. The woreda has an international boundary of more than 60 km with Sudan.

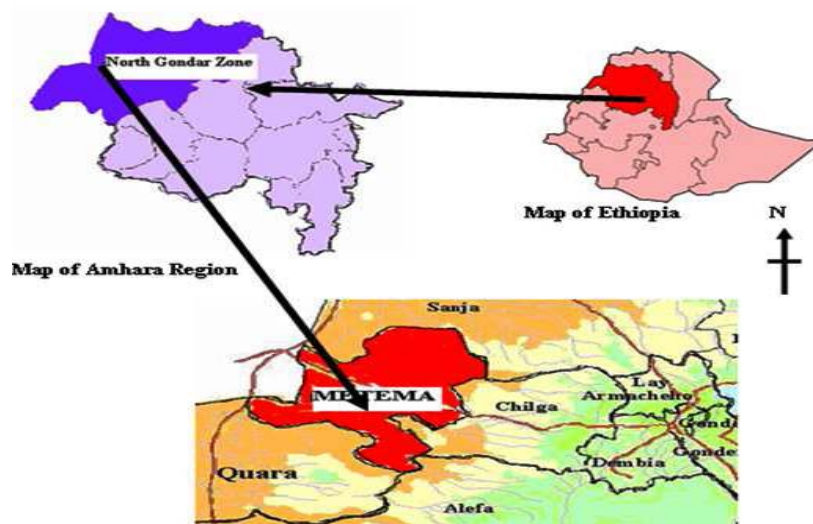


Fig: Map of the study área.

3.2 Topography and Areal Coverage

The topography of Metema Woreda is characterized by plain land. This indicates that larger proportion of the woreda is characterized by more than 90 percent less than 1000 m above sea level. The elevation of the woreda ranges from 500 meters to 1666 meters above sea level. The total areal coverage of the woreda is about 440,085 hectares.

3.3 Climate

According to Woreda Agricultural and Rural Development Office, the woreda has kola agro-ecological zone with annual temperature range 28–43 degree centigrade. The daily maximum temperature becomes very high during the months of March to May, during which the temperature can reach as high as 43 °C. The mean annual temperature is about 31 °C (ILRI, 2005). Mean annual rainfall of Metema area ranges from about 850 to around 1100 mm, and it receives a uni-modal rainfall (ILRI, 2005). The rainy months extend from June to the end of September. However, most of the rainfall is received during the months of July and August, during which the rainfall is erratic.

3.4 Land use

According to the Woreda Agriculture and Rural Development Office, the land use of the woreda is classified in to 86,360 hectare for farmland; 4,400 hectare for grazing; 177,600 hectare for forest; 3,660 hectare for settlement from this 894 hectare is used for social services; 116.2 hectare for perennial crops; 89,943 hectare for bushes and shrubs; 3708 hectare water bodies; 17,471 hectare could be cultivated; 7,752.2 hectare unusable and the remaining 6,800 hectare is for miscellaneous activities. Forest and bush land are diminishing over time due to farm land expansion.

This depicts that, the land use type and pattern of Metema woreda is more diversified. The nature of land use in the woredas is that larger proportion of the land is used for forest land. The land area used for perennial crops (about 0.03 percent) is smaller than others followed by irrigable land and settlement area and land covered by water bodies respectively.

3.5 Population

According to CSA (2007) the population of Metema Woreda was about 110,231. Of the total population 88,354 (80.15 percent) are rural inhabitants and 41,229 (46.66 percent) are female. This indicates that the numbers of rural inhabitants are more numerous than urban dwellers and the number of male and female population in the woreda are proportional. The inhabitants of the woreda are belonging to the Amahra ethnicity and Amharic and to some extent Arabic are media of communication. With regard to religion almost all inhabitants are followers of Orthodox Christians (90 percent), but there are few Muslims residing in the urban kebeles of the woreda. The population density of the woreda is about 25 persons per square kilometers.

The original residents of the area were Gumuz. Until recently, they have practiced slash and burning and hunting wild animals. They have also been engaged in making household furniture like chair, bed, pot and others. When the area became gradually populated, the natives were dominated by the new settlers. The original settlers (Gumuz) are now found only in three peasant associations, the Kumer Aftit, Tumet and Shinfa.

The total number of the indigenous people is around 500 (ILRI, 2005). Hence, much of the area is recently occupied by settlers from the highland part of the region. According to WoARD (2011), in the years of 2003, 2004 and 2005 during which new settlement programs occurred, 12,777, 4,124 and 16,258 new settlers were settled in the district, respectively. It shows that the population of the woreda capital, Metema and the Woreda as a whole increases rapidly from year to year.

3.6 Farming system

The major economic activity in the woreda in which the population engaged is mixed farming, which is a combination of crop production and livestock rearing and to some extent legal and illegal trade because of its proximity to the border. Due to erratic and torrential rainfall pattern farming operation is always at risk such as crop failure due to drought, shortage of livestock feed etc.

The agricultural production system in the study area is crop-livestock mixed. The crop-livestock mixed production system is the predominant system and exists in all over the district throughout the year. Crop production is the main agricultural activity for the livelihood of the smallholder farmer in the study area. The major crops grown include sorghum, rice, cotton, sesame, haricot bean, soybean and new emerging crops like teff, chickpeas and banana.

Livestock production is an integral part of the land use system. Production of cattle (as draught power, milk and meat), shoat (income and meat), donkey and camel (as Karoo and transport) and poultry was commonly practiced. WoARD (2009) report shows that the livestock population of the district is composed of 136,910 cattle, 32,024 goats, 1,686 sheep, 7,164 male donkeys, 7,127 poultry, 400 camels and 23,789 beehives. Cattle in the district are exported both legally and illegally, through smuggling to Sudan, while goats and other animals are mainly sold in local markets.

According to ILRI (2005), Metema district was categorized into cotton, sorghum and rice/ livestock based/ and sesame, cotton, and sorghum/ livestock based farming systems based on the type of crop production. The livestock production system is similar in both farming systems. Therefore, there are two types of farming systems used in the study district namely cotton based farming system and sesame based farming systems. Each has its own characteristic features regarding to the crop production nature.

According to ILRI (2005), 4 out of 18 peasant associations (PAs) belong to cotton farming system. They are Maka, Awlala, Genda Wuha and Kemechela. They are found in the Northeast parts of the district. The PAs are relatively colder in temperature, have higher altitude and rainfall. Farmers in the PAs practice slightly early planting of crops. The soil is black and water logging is a problem. The majority of the soils in this farming system have vertic property.

Many of the areas are also flat. The PAs in this farming system have different features in terms of suitability for crop production and amount of rainfall received. The majority of the soils are only suitable for growing cotton and rice. The PAs predominantly grow cotton and sesame in little amount. Cotton is grown in wide areas while sorghum and sesame are planted on very smaller areas.

Fourteen PAs belong to sesame based farming system. In order of importance, sesame, cotton and sorghum are the major crops produced in this farming system. A farmer could grow any one of these crops as the environmental conditions are equally suitable for these crops. The choice is set by the farmer upon observation of the season, high or low rainfall, and possible market prices. The altitude and rainfall in this farming system is less than the cotton based farming system. The altitude range for this farming system is between 550 and 700M asl (ILRI, 2005).

Farmers and agriculturists believe that the underground water table is high. In some places, sufficient amount of water could be obtained at less than 10m deep. Besides, three rivers are found in this farming system. These rivers make the area more potential for crop and livestock development. This farming system also has extensive grazing areas. There is also a place where the natural plantations for gum and incense are located.

3.7 Infrastructure

The availability of sufficient economic, social and physical infrastructure directly influences rural-urban linkages and the potential that small towns could play in balanced development process. Physical and social infrastructures with no doubt play a key role for rural and regional development.

A research on the rise of secondary cities also identifies ground transportation (roads and railways) as essential infrastructural investments. Road access within and between small towns and their hinterlands could faster rural-urban linkages in the form of production and consumption linkages. Social infrastructures like schools, health services, telecommunication, postal and banking services are also seen as necessary investments for development. The next section gives a general overview on physical and social infrastructure developments in the study areas.

3.7.1 Physical Infrastructure

The nature of land scope, resource endowment, policy environments of the government are among other things, some of the factors that resulted in unbalanced development of physical and social infrastructure.

3.7.1.1 Road Transport

The main asphalt road from Addis Ababa to Metema via Gondar about 800 km far from Addis Ababa could reach Metema woreda. The total length of the available road is about 483 km. It has 80 km asphalt road that is part of the main high way to Sudan, 55 km Gravel road and 348 km dry weather road joining kebeles each other in the woreda.

3.7.1.2 Water and Electricity

Efficient and effective production and consumption linkages could be promoted by the development and availability of such urban infrastructures like water and electric power supply.

Most of woreda capitals and even other minor towns in North Gondar zone receive electric power and are connected to the national grid. Surprisingly, the same is not true for Metema town. This town enjoys electric power supply during most of the days for about a maximum of 4 hours using private generators. However, in Metema woreda one rural kebele(Kokit), and three urban kebeles (two kebeles of Gendewuha, woreda capital and one kebele of Shenfa) have an access to 24 hours electric power.

With regard to water service at the woreda level, the woreda, has about 19 rural kebeles with shallow wells and about 2 rural kebeles with hand pump wells. This indicates that about 86.36 percent of the rural kebels in the woreda are users of water supply. At the woreda level it covers about 75.83 percent of the woreda's population.

3.7.2 Social Infrastructure

Similar to physical infrastructure social and institutional infrastructures such as education and health facilities, bank and/or credit services, and postal and telecommunication services are also important in promoting rural-urban linkages between hinterlands and towns for enhancing a more productive economy.

3.7.2.1 Education and Health Services

The comparison of distribution of social infrastructures such as education and health services at the woreda level, more or less there are proportional number of educational and health centers. The only difference is that there are one high school and preparatory school one vocational training which is administered by woreda education office.

3.7.2.2 Telecommunication and Banking Services

At the woreda level the study area Metema town in Metema woreda has no digital telephone service and there about no clients for fixed telephone. Recently from the rural kebeles found in the woreda almost all kebels are users of wireless telephone service. However, the service is intermittent and has no quality.

Moreover, Metema town has no postal service. As far as the banking service is concerned, at the woreda level, there are three banks in Metema town, two of them private and one government bank, commercial bank of Ethiopia.

3.8 Investment

Currently, there are investors who are engaging in agricultural sector in the woreda. These investors owned about 28,816 hectare of land. Of these majorly 94 are found in Delelo, 84 in Tumet and 386 minor investors in different parts of the woreda. These investors create employment opportunity for the local people and people from different corners of the country. They employed 4420 permanent employees and about 38,100 daily workers. All of them account about more than 129 million Birr fixed capital and more than 86 million Birr recurrent capital.

4 Patterns of Rural-Urban Linkage

4.1 Frequency of Visit to Small towns

Production, consumption and public service linkages are some of the basic forms of rural-urban linkages that may occur between urban centers and their surrounding hinterlands. The frequency of visit of farm households to the nearby towns

helps to detect the observed patterns of linkage. Towns are expected to provide markets for agricultural produce, serve as source of urban goods and services and off -farm employment to their hinterland people.

Since they are found at the lower level of urban hierarchy and are immediate destinations of rural people who live in the hinterlands, small towns are the most frequently visited centers by the rural people. In the same way, small towns in the study areas are the most frequently visited centers by almost all the sample households. The pattern of the frequency of visit varies from daily to once a month. As a result the observed frequencies of visit from different hinterlands are not the same (see Table 4.1).

Table 4.1. Frequency of Visit to the nearby small towns by KAs (Number and Percentage of households).

Frequency	Metema Woreda					
	Kumerafit		Kokit		Total	
	No	%	No	%	No	%
Daily	11	15.71	15	12.5	26	13.68
Once a week	10	14.28	37	30.83	47	24.74
Twice a week	37	52.86	43	35.83	80	42.1
Four times a week	1	1.43	3	2.5	4	2.1
Once a month	1	1.43	1	0.83	2	1.1
Twice a month	-	-	2	1.67	2	1.1
Total	60	85.71	101	84.73	161	84.73

Source: Own Survey (2011)

Note: No- Number,

% - percentage

Majority of the sample rural households in both kebeles visit the nearby small twice a week followed by once in a week and once a month. A χ^2 and ANOVA revealed that there is a significant difference in the frequency of visit between the two sample populations (see Table 4.2).

Table 4.2. χ^2 and R-value for frequency of visit by kebele.

Woreda	1	2	3	4	5	6	Sum
Kumerafit kebele	15(19.53)	107(85.95)	55(75.35)	2(3.35)	25(15.07)	22(13.39)	240
Kokit kebele	20(15.46)	47(68.05)	80(59.65)	4(2.65)	2(2.65)	2(10.6)	190
Sum	35	154	135	6	27	24	430
D.F(two tailed)=5							
Table value(two tailed)=11.07							
Level of significance(p)=0.05							

Numbers in parenthesis are expected frequencies; D.F-Degree of Freedom

Note: 1= daily, 2= once a week, 3= Twice a week, 4= 4 times a week, 5= once a month, 6= twice a month

$$\chi^2 = 55.03$$

Standardized Residual (R- value) for frequency of visit

Woreda	1	2	3	4	5	6
Kumerafit Kebele	-1.03	2.27	-2.11	-0.74	2.56	2.35
kokit kebele	1.15	-2.55	2.63	0.83	-2.87	-2.64

$$R = \frac{(O-E)}{\sqrt{E}} \quad (1)$$

A variety of reasons are presented by sample households for visiting nearby small towns in the study areas. Among other things, market attendance to buy and sell items takes the largest share. Except this, all other purposes differ between the study sites in both kebeles, though there are multiple purposes (responses). In kumerafit kebele, farm households in the study sites reported that others (asking relatives, recreations, meeting etc), administration (court, police etc), social service (education, health) and lastly daily labour as their second to fifth reasons to visit nearby small town.

However, in kokit kebele sample farm households presented daily labour as their second most important reason followed by administration for visiting nearby small town (see Table 4.3). This falls in line with the expectation that farmers in food insecure area rely on the town for their livelihood.

Table 4.3. Reasons (purposes) for visiting small towns by KAs (number and percentage of households).

Reason/ Purpose	Metema woreda					
	Kumerafitit kebele		Kokit kebele		Total	
	No	%	No	%	No	%
Buy and sell items	67	74.44	98	65.33	165	68.75
Social service	4	4.44	15	10.0	19	7.92
Administration	23	25.26	13	8.67	36	15.0
Daily labor	2	2.22	5	3.33	7	2.92
Other	21	23.33	26	17.33	47	19.58

Source: Own Survey (2011)

Regarding the mode of transportation to the small towns, sample farm households in the study sites reported that about 65 percent in kumerafitit kebele and about 95 percent in kokit kebele visit small town on foot. However, about 33 percent in kumerafitit kebele use either pack animals like cart, public transport or other means such as bicycle, while about 5 percents in kokit kebele use pack animals only (see Table 4.4).

Table 4.4. Mode of transport to Visit Small towns by kebele.

Mode of Transport	Kumerafitit kebele		kokit-kebele	
	Number	Percent	Number	Percent
Pack animals	21	16.67	7	5.00
Public transport vehicles	10	7.93	-	
On foot	82	65.00	143	95.00
Others	13	10.3	-	-

Source: Own Survey (2011)

Measuring in all these indicators and under the characteristics of farm economy like land holding size, livestock production and the volume of crop production between sample farm households in Metema woreda of North Gondar zone, the sample farm households in kumerafitit kebele are in a better position than their counter parts. On the other hand, the need to supplement low agricultural production in kokit kebele lead to participate in low return non-farm activities. Therefore, we can generalize that the patterns of visit of small towns by hinterland people differ depending on the level of production of households.

4.2 Factors Affecting Rural-Urban Linkage in the Study Areas

As it is stated in the literature factors that affect rural- urban linkage can be categorized broadly as global, national and local factors. Largely it is the local factors that affect the linkage of small towns and their surrounding hinterlands. Several local factors are postulated to determine rural- urban linkages in the study areas.

These local factors can affect frequency of visit to the nearby small towns, pattern of input usage, the utilization of public service facilities, the consumption pattern of basic consumer and consumer durable goods, the participation in non- farm activities are supposed to have a significant influence. Some of these factors are income from agricultural activities and production status and resource endowment; distance from small towns; infrastructure development; non-availability of financial institutions and service provision capacity of towns.

It is very difficult to see these factors separately. Because one factor directly or indirectly influences the other and largely may lead to vicious circle.

4.2.1 Income and production status and resource endowment

For estimation of income volume of crop production and number of livestock owned are used as a proxy variable. Farm households who produce larger production together with large number of livestock ownership can have a possibility to visit the nearby small town frequently. And majority of the sample households in both sample sites forwarded that their purpose of visiting nearby small towns is market attendance. However, the volume of production and resource endowment varies considerably between the sites in the two kebeles; hence the purpose of market visitization may vary accordingly. Land holding size and its fertility can be used as indicator of resource endowment.

The purpose of visit to small towns and the participation of non-farm activities are directly or indirectly related with the volume of production and resource endowment. Farm households in sample kebeles apart from selling their production, they also frequently visit small towns either to sell products obtained from non-farm activities or seeking non-farm jobs. Participation in non-farm activities also varies with income level, since poor farmers are expected to be widely practiced in low return non-farm activities and relatively rich farmers in high return ones.

4.2.2 Distance from small towns

Distance is approximated between farm homesteads and nearby small towns in terms of travel time. Distance is highly significant for farmers in the hinterlands of small towns. It could have a negative influence on the frequency of visit to nearby towns.

Farm households whose homesteads are closer to the nearby small town have more chance to visit the nearby small town more frequently than those farm households whose homesteads are located at a distant place. As presented in the preceding section of this chapter, frequency of visit to nearby small towns by farm households in from four times to daily indicate that majority of their homesteads are located relatively closer to the nearby small town (between 3–4 km). On the other hand, in both sample kebeles some farm households who mentioned visiting the nearby small town once a month forwarded that their homesteads are located relatively within 7–9 km away from the nearby small towns. This indicated that, increased travel time to towns has negative effect on households visit to towns.

Therefore, we can conclude that impact of distance on the pattern of frequency of visit to nearby small towns agrees with variation in the levels of infrastructures development and the nature of landscape between the two sample kebeles. The frequency of visit in turn has influence on rural-urban linkages between towns and their hinterlands.

4.2.3 Infrastructure development

Infrastructure usually defines as underlying basic institutions and facilities or other essential elements that are necessary to sustain and enable economic growth. It represents a broad spectrum of activities and services without which no activity can undertake in the economy. It plays a key role in the society and constitutes the wheels, if not the engine of development. Infrastructure broadly classified in to physical, social and financial.

Improved infrastructure is a necessary condition for improving productivity in rural areas as well as for enhancing access of agricultural produce to both urban areas and export market. Therefore, in many ways developing countries, addressing rural-urban infrastructure gaps requires more government action. Infrastructure linkage to the economy is very multiple and complex, as it affects production and consumption directly, creates positive and negative spillover effects and involves large inflow of expenditure. It increases productivity; lowers production cost; improves quality of life; raises international competitiveness; attracts investment and helpful in urbanizing the economy.

In the study areas, infrastructure development is another local factor that may affects rural-urban linkages. There is some level of variation between the sample sites in the level of infrastructure development especially road transport. Rugged physical terrain, weak infrastructure based and inaccessibility are claimed to be some of the attributes of frequency of visit problems to nearby small towns.

4.2.4 Availability of financial institutions

The financial linkage of small towns to its hinterlands is based on the availability of financial institutions in the small towns, which will stimulate the rural people to use these institutions for loan and savings. In Metema town there are both governments and private formal financial institutions including branches of Amhara Credit and Saving Institutions.

The existence of financial institutions, especially banks in one area contribute a lot to positive rural-urban linkages and thereby play a significant role for livelihood diversification of rural households. Households who have access to credit can use it for a wide range of purposes such as for agriculture inputs purchase, for purchase of consumer durable and non-durable goods, for social services such as medical treatment and education.

In view of the fact that farmers in the study area have high access to formal credit service institutions, though some resort to informal credit sources, such as relatives and friends in urban areas.

There are thus very high financial flows from urban-based formal sources to rural households of the study kebeles. In the study sites, however, the main sources of financial capital for both rural and urban households may financial institutions.

The credit and saving scheme formed through the availability of financial institutions has helped to make rural-urban linkages sustainable and more effective towards initiating development activities. Credit and saving activities have cohesive effect between rural and urban areas and made rural-urban linkages stronger.

4.2.5 Economic dynamism of towns

The urban economies have potential for high growth if they can perform the role of producers of goods and services required by rural as well as urban economies and that of provider of markets and marketing services for rural outputs. Ample opportunities exist for strengthening and expanding the urban and rural economies for poverty alleviation. Thus strengthening local as well as regional level linkages to promote and expand economic activities is the major

operational strategies of rural-urban linkage for promoting economic development and sharing its benefits to help the people escape wide spread poverty.

4.2.6 Service utilization capacity

The other indicators of linkage which are associated with service provision capacity of towns are the utilization of public services such as education and health. The utilization of these services is also a function of income. Measured in terms of aforementioned indicators households in both sample kebeles have relatively proportional income. And households in Metema woreda have a capacity to use education and health services both in the nearby and distant places. However the utilization of these services is also related to the level of education of households head, family size and income and attitude towards the returns of education.

5 Conclusion and Recommendations

5.1 Conclusion

Improved rural-urban linkage is a vehicle for balanced socio-economic development of both rural and urban areas. The following are the major conclusions that could be drawn from the patterns and forms of rural- urban linkages in the study areas.

The study results indicated that, volume of production and resource endowments do not vary considerably between the sites. Hence, the purposes of market visit do not vary accordingly. Larger proportion of farmers' households in both sample sites visit the nearby small town (Metema) once a week.

The numbers of business activities located in Metema are larger. This has influence on the service provision capacity of towns to the hinterland people. Service provision capacity has in turn impact on rural-urban linkage.

The small towns and their corresponding hinterlands are located in the same geographical setting with proportional level of infrastructure development. The variation in the level of infrastructure has resulted in variation in rural-urban linkage. Hence, it implies that the availability of better infrastructure facilitates better rural-urban linkage.

6.2 Recommendations

Based on the observations made so far, the following are recommended to be in place to enhance rural-urban linkages and developmental role of the small towns in the study areas.

The small towns are similar to other small towns in the country and lack sufficient capacity to provide facilities and services to their dwellers and hinterland people. Hence, promoting the service provision capacity of small towns to provide sufficient services for its dwellers and hinterland people is necessary.

Road that connects rural and urban areas is very important to bring about all kinds of linkages. The low level of road network implies that the vast majority of areas is inaccessible to all weather roads reduces communication and mobility. It is important to prioritize road infrastructure development that links villages and local towns. This will enhance rural-urban linkages and facilitate mobility of people, flows of agricultural products and access to critical services.

It is important to facilitate the provision of credit/loan to farm households for input purchase from both formal financial institutions and credit and saving institutions. This will have an impact on the increment of production which in turn will have an impact on rural-urban linkage between towns and hinterlands.

Non-farm activities are underdeveloped. They can play a role in linking rural and urban areas. Therefore, promoting rural non-farm activities to create significant synergies between the rural and urban centers is needed in agriculturally rich and poor areas.

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Occupational Health and Safety and its Interdependencies with Employee Satisfaction, Employee Motivation, and Productivity in Services – A Systematic Literature Review

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Service employees are exposed to risks threatening their health and safety in the workplace. Feeling to be at risk potentially influences motivation and satisfaction of employees and can also affect the performance of a firm. Detailed knowledge about the effects of occupational health and safety on productivity, employee motivation, and employee satisfaction will contribute to the understanding of these effects. Within this paper we perform a systematic literature review and uncover a lack of empirical studies that analyse the named relationships. Still, these relationships exist and reflect intuition, e.g., the better the occupational health and management system, the higher the employee motivation.

1 Relevance of Occupational Health and Safety in Services

As all other employees, service employees are exposed to risks threatening their health and safety in the workplace. For instance, in hospital laundrettes employees get in contact with contaminated laundry items that pose a serious risk to their health. However, within the variety of services, occupational health and safety risks differ as well. Think of banking services that involve other types of risks, e.g., bank hold-up, aggressive customers, burn-out, and different proportions of risks other than health or construction services, e.g., risk of infection, accident on site (O'Reilly, Olomolaiye, Tyler, Orr, 1994; Rozenfeld, Sacks, Rosenfeld, Baum, 2010). In conclusion, measures promoting occupational health and safety, defined as “*minimizing of hazardous effects and [...] the prevention of disease*” for employees (Luczak, Rötting, Brüggmann, 2000, 652), have to be in line with the safety needs of the service employees. In some cases, risky steps within the service process can be remodeled in such a way that employees are no longer exposed to certain risks. For instance, in hospital laundrettes robots can replace employees that normally process dirty and potentially contaminated laundry items (Gliem, Klabuhn, Litwin, 2014, 45). However, there are process steps in services, e.g., in health care services, that cannot be remodeled. If employees in such services are not properly protected in their work environment, there is a greater risk of accidents. Moreover, employees may refuse to go on with their job. Potential future employees might reconsider their occupational choice in order to avoid health and safety risks in the workplace and therefore induce staff shortages (Loeppke, 2008, 96-97). Motivation and satisfaction of employees facing safety threats in their workplace may decrease. As a consequence, productivity will drop. Bottlenecks in the supply of important services, e.g., health care, might be the result. For these services measures protecting the health and safety of employees are highly relevant. At the same time these measures need to be considered carefully for their connected costs and benefits. This is of particular interest when measures go beyond the minimum set of legal regulations. While costs can be analyzed quite easily, the benefits of occupational health and safety efforts for services are hard to evaluate.

In order to give evidence about the interdependencies between occupational health and safety and employee satisfaction, employee motivation, and productivity in services, we conducted a systematic literature review within this paper. The remainder is structured as follows: in Section 2 we identify the need for a systematic literature review on occupational health and safety within the area of service research as well as derive our research questions. Subsequently, in Section 3, we present the methodology for the systematic literature review. The results of our systematic literature review will be presented in Section 4. Results of the review, suggestions for future research, managerial implications, and limitations and conclusions of our research will be identified and discussed in Section 5, Section 6, Section 7, and Section 8.

2 The Need for a Systematic Literature Review on Occupational Health and Safety in Services

Systematic literature reviews serve as a method for the synthesis of knowledge within a specific area of research. They pinpoint key contributions and uncover gaps and weaknesses in past research. Results of systematic literature reviews guide future research (Cooper, 1998, 3). Furthermore, they narrow down the gap between research and practice by presenting the state of the art of research in a certain field of interest (Denyer & Tranfield, 2006, 214). The systematic fashion of the review process reduces biases that originate from the researchers conducting the review, e.g., using feedback loops, (Kitchenham, 2004; Tranfield, Denyer, & Smart, 2003). Therefore, reliable and reproducible evidence is generated (Cooper, 1998, 3). Within our research context, the systematic literature review is considered to be an

appropriate means to synthesize detailed knowledge about the interdependencies between occupational health and safety and employee satisfaction, employee motivation, and productivity.

Neither in the area of services nor in the field of occupational health and safety research systematic literature reviews have been conducted. However, our literature search revealed that several reviews (systematic and non-systematic) in the field of occupational health and safety research exist each targeting different key aspects. For instance, factors influencing occupational health and safety of young employees were elaborated from a literature review by Laberge and Ledoux (2011). Additionally, literature on particular service industries, e.g., construction industry (Laukkanen, 1999), or defined work spaces, e.g., robot workplaces (Helander, 1991), was reviewed. Literature reviews targeting at the evaluation of specific occupational health and safety measures were conducted in the attempt to unveil the potential influence of occupational health and safety measures on performance indicators of a firm (Olson, Winchester, 2008; Robson et al., 2007). Regardless, evidence was not sufficient in these days (Robson et al., 2007, 349) and newer results of research in this field have to be considered. One review that regards the interdependencies of employee satisfaction, employee motivation, and productivity with occupational health and safety is missing. Our paper aims at closing this knowledge gap by undertaking a systematic literature review and answering the following research question:

RQ: Which interdependencies between occupational health and safety and employee satisfaction, employee motivation, and productivity in services exist?

In order to answer this question, we will also discuss the changes of occupational health and safety needs of service employees over time that may have arisen from development and integration of technology in services and put into question the examination of the services industry in isolation from the manufacturing sector.¹⁴²

Results of this review are expected to facilitate the justification of occupational health and safety measures in general as well as encourage practitioners to invest in corresponding programs. Furthermore, the development of proper measures tailored to the specific needs of employees in different service areas will be forwarded.

3 Methodology

Within our systematic literature review we considered several approaches of different researchers from different fields of study (Cooper, 1998; Kitchenham, 2004; Tranfield, Denyer, & Smart, 2003). This enabled us to refine the stages of the review process and customize them to the needs of our specific research topic. Especially the proposed approach of Kitchenham (2004) enriched our review process with several feedback loops that contributed to the reduction of bias. As a result, we conducted the systematic literature review undergoing the stages presented in Figure 1.

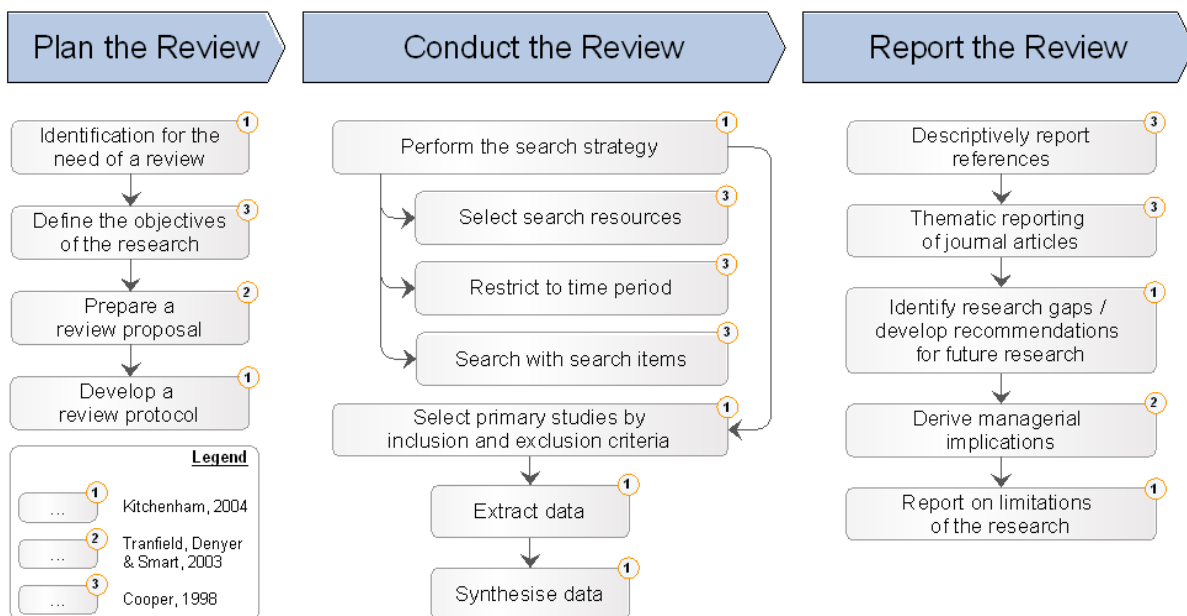


Figure 1. Systematic Literature Review Process.

One of the first things within the systematic literature review which needs to be done is the definition of the search terms. In accordance with Kitchenham (2004, 7-8), we conducted a prior search in Google Scholar to refine search terms and increase the accuracy of results. Thereby, we focused on literature reviews (systematic and non-systematic) on the topic of occupational safety in general. The corresponding results helped us to find synonymous expressions for occupational safety that are “in use” in research. As well as this, we reduced the terms “employee motivation” and

¹⁴² Thanks to an anonymous reviewer who made this suggestion.

“employee satisfaction” to “motivation” and “satisfaction” to not exclude relevant articles from the review. For the same reason we did not include the term “service” or “services” in our search. In order to prevent the exclusion of articles that were carried out in a specific service branch, e.g. public administration. We conducted the search using search strings that were a combination of occupational safety or one of its synonyms and one of the terms “productivity”, “motivation”, or “satisfaction”. The list of search terms that were used is shown in Table 1.

Table 1. Search Terms for Electronic Databases.

Coding	Search Item
A	Occupational safety
B*	Workplace safety
C*	Safety at work
D*	Job safety
E	Productivity
F	Motivation
G	Satisfaction
*	Synonymous expressions for occupational safety

The search strings were employed in nine electronic databases. The complete list of electronic databases is shown in Table 2. We restricted our search to articles published in English. Additionally, they need to be published within January 1990 and December 2013. As another constraint, we only considered academic journals. Depending on the search mask of the electronic database, search terms or search strings were employed in the search fields “title of the publication”, “abstract”, or “full text”. We coded the different fields where search terms can be entered resulting in a three digit letter combination. Position one in this combination was assigned to the “title of the publication”, position two to the “abstract”, and position three to the “full text”. For instance, if the electronic database enabled the researcher to search for “occupational safety” in the title of publications and for “productivity” in the full text of the publication, this would result in the combination A.0.E with zero stating that none of the search terms were searched in the abstracts of publications. The results of the search in the electronic databases and the correspondent results are presented in Table 2.

Table 2. Number of Search Results per Electronic Database.

Database	1990-2013
Science Direct	608
Business Source Premier	396
Taylor & Francis	235
Wiley Online Library	118
Web of Science	101
Emerald Insight	88
Econ Biz	65
SpringerLink	58
SAGE Journals	38
	1707

Our database search for relevant literature resulted in 1,707 hits. The list of results underwent several steps of reduction, which included the removal of duplicates and of articles published in a language other than English. Due to the varying search masks offered by the databases, it was not possible to exclude publications from the research results that were not articles published in academic journals. Therefore, one selection step was to remove book reviews, books, or chapters of collected editions as well as non-article journal components, e.g., editorials, from the search results. Further inclusion and exclusion criteria are defined and described in Table 3.

Table 3. Inclusion and Exclusion Criteria for Articles.

Inclusion Criteria (IC)	Description
IC-1	The article's subject is occupational health and safety management, the implementation and evaluation of occupational health and safety interventions, or the assessment of occupational health and safety risks.
IC-2	The article presents an empirical study carried out in the context of occupational health and safety.
IC-3	The empirical study presented in the article contains variables that can be interpreted as operationalization of occupational health and safety, productivity, employee motivation, or employee satisfaction.
IC-4	The empirical study presented in the article analyses the relationships between the variables occupational health and safety and productivity, employee motivation, and employee satisfaction.
Exclusion Criteria (EC)	Description
EC-1	The article's full text was not accessible or available until the completion of this review article.
EC-2	The article presents an empirical study that is published again in a newer article.
EC-3	The article's main focus is on reviewing literature on the topic of occupational health and safety.
EC-4	The article's main focus is on proposing a model, framework, or research agenda on the topic of occupational health and safety.

To apply inclusion criterion 4 (see Table 3), we had to define *productivity*, *employee motivation*, and *employee satisfaction* first. Accordingly, *productivity* has to be an output-input-relationship with the outputs and the inputs not being further determined. *Employee motivation* is a process that fosters engagement, performance, and continuity within the occupational context (Luthans, 1998). *Employee satisfaction* can be described as a „(...) favorable attitude or pleasurable emotional state that result from a Person's job experience or a fit between a person and an organization“ (Wanous, Lawler, 1972, 57).

Based on the above inclusion and exclusion criteria, the selection process was performed independently by the two authors. Subsequently to every selection step, the results were compared and discrepancies were discussed. The selection steps and the corresponding results of single selection steps are shown in Figure 2.

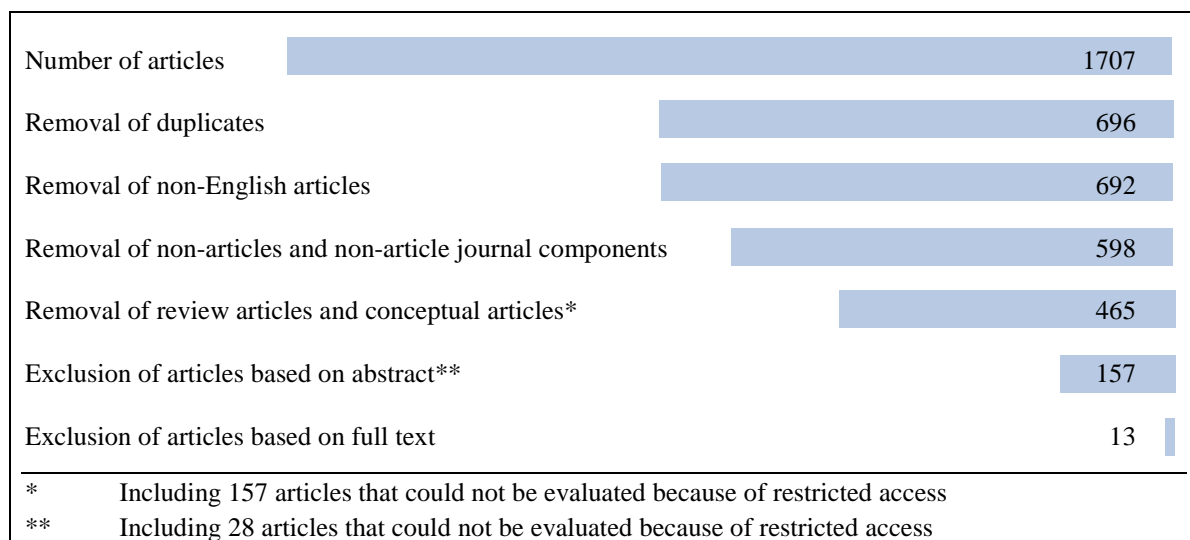


Figure 2. Selection Steps and Corresponding Results.

To answer the research question defined in Section 2, we needed to extract corresponding data based on the final selection of studies (Harden, Garcia, Oliver, Rees, Shepherd, Brunton, Oakley, 2004, 796). The first three data items

provide information about the year of publication (DI-1), the journal the article was published in (DI-2), and the country of origin of researchers who wrote the article (DI-3). It should be noted that this systematic literature review focuses on services. Therefore, data about the setting of the study has to be provided (DI-4a). If available, information about the concrete industry where the study was carried out was extracted also (DI-4b). Further, it was assessed whether data presented in the articles was collected predominantly through a quantitative or qualitative approach or a combination of both (DI-5a) and which concrete approach was employed (DI-5b). Decisive for this review were the interdependencies between the variables of occupational health and safety, productivity, employee motivation, and employee satisfaction. Hence, data items 6, 7, 8, and 9 present information about whether the variables were included and how they are coded in the article. Data about the interdependencies of these variables is given by data item 10. Both authors performed the data extraction independently and reviewed the results from the other when finished. Discrepancies were discussed and revised. The data items are presented in Table 4.

Table 4. Data Items and Description.

Data Item	Description
DI-1	Publication year
DI-2	Journal
DI-3	Researchers' country
DI-4a	Manufacturing (M) or Service Sector (S)
DI-4b	Specific industry or industries
DI-5a	Qualitative (1) or quantitative approach (2)
DI-5b	Method for data collection
DI-6	Operationalisation of occupational health and safety
DI-7	Operationalisation of productivity
DI-8	Operationalisation of employee motivation
DI-9	Operationalisation of employee satisfaction
DI-10	Relationship between variables analysed

In order to synthesise the resulting data we chose the narrative synthesis approach (Barnett-Page, Thomas, 2009; Denyer, Tranfield, 2006). This approach fits best to the structure and to the characteristics of our search results. It allows combining studies that used quantitative and qualitative approaches for data collection (Lukas, Baird, Arai, Law, Robert, 2007, 4) and incorporate the different embodiments of the concept of occupational health and safety that were found in the articles reviewed (Denyer, Tranfield, 2006, 219; see Section 4). Furthermore, the narrative synthesis approach aims at the provision of deep insights into a complicated research topic encouraging researchers and practitioners alike, and sharpening their view for future research and development of best practices (Rummrig, Fitzgerald, 2001). This corresponds with our research goals defined at the end of Section 2.

4 Results

According to the selection of studies as presented in Table 6 data from thirteen articles has been extracted. After we synthesised the data, the following results could be derived.

4.1 Geographical Distribution

Regarding the geographical distribution of articles, research from the USA was presented in five articles, two studies were carried out in Australia, and Asian and European countries were represented with one article each. Two articles were a joint work of researchers from two different countries (Taiwan and USA, Australia and the Netherlands). Research from African countries was not included.

4.2 Temporal Extent

Figure 3 presents the distribution of articles over time.

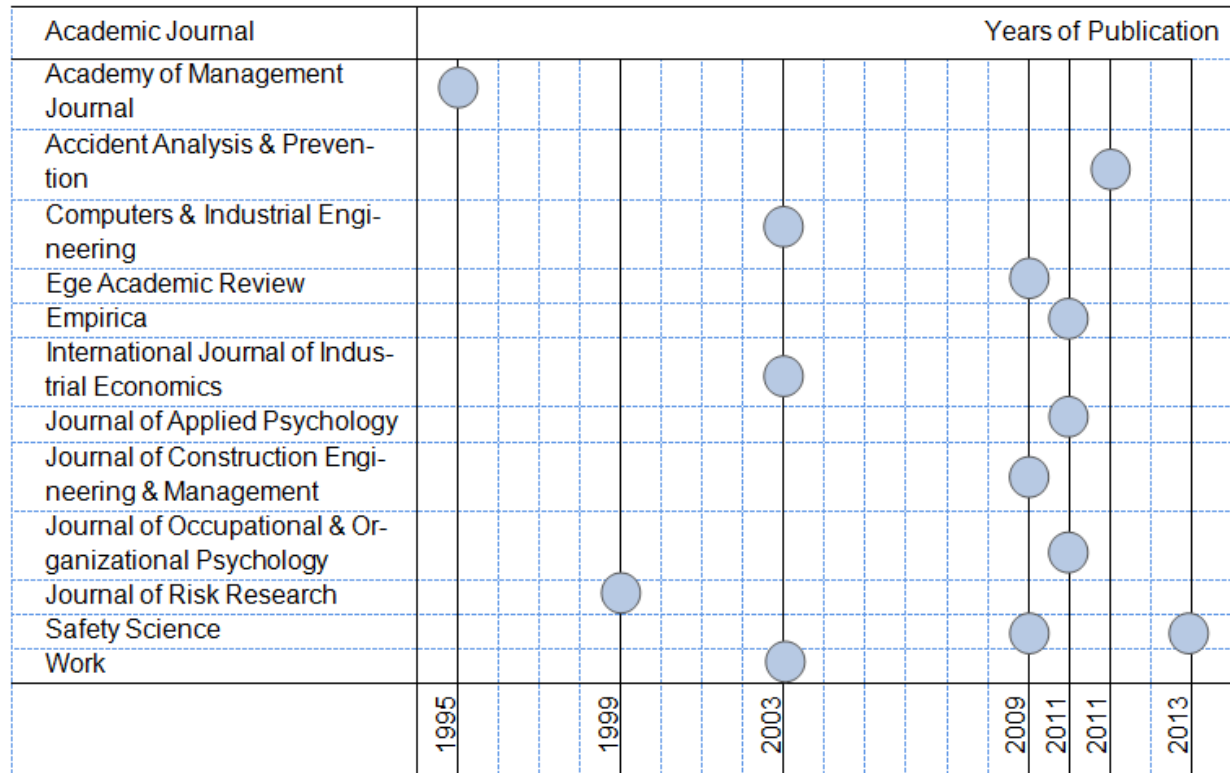


Figure 3. Distribution of Articles from 1990 to 2013.

Eleven articles were published after year 2000 and two articles were published before (1995 and 1999).

4.3 Sector

Six studies were carried out in services, three studies were settled in the manufacturing sector, and four studies were conducted in the service and the manufacturing sector. The particular branches covered by the studies are presented in Table 5. Three articles did not provide information about the particular branch in which the study was carried out.

Table 5. Manufacturing and Service Industries Presented by the Reviewed Studies.

Manufacturing Sector	Services Sector
Electronics	Construction
Metal	Health Care and Community Services
Plastic	Education
Food	Hoteling
Chemical	Insurance
Paper and Packaging	Public Administration
	Retail Trade
	Fire Service

4.4 Methodology

Only two articles employed a qualitative approach using a case study or case study like approach including interviews and observations for gathering data. Besides standardized (one study) and telephone assisted interviewing (one study), a questionnaire instrument was the predominant method to collect data in the studies using a quantitative approach (nine studies).

4.5 Operationalisation of Variables

The construct of occupational health and safety was presented heterogeneously in the included studies. There are researchers (Kilic, Selvi, 2009; Leoni, 2010) that measure occupational health and safety by a combination of items that assess and evaluate the actual occupational health and safety risks, the assessment of safety measures as well as the evaluation of the workplace. Thereby, general issues such as light, temperature, or aspects of working life that are not directly associated with the occupational health and safety measures employed by a firm are considered, e.g., employee awards or sufficiency of salaries (Kilic, Selvi, 2009, 913). Other studies put more emphasis on the “safety” aspect of occupational health and safety. Concrete safety measures, e.g., analysis of hazards, employee training (Shikdar, Sawaqed, 2003, 564), the use of special equipment (Mitropoulos, Cupido, 2009, 411), ergonomic interventions (Yeow, Nath Sen, 2003, 153), the safety management system implemented by the firm, e.g., planning for the case of emergency (Fernández-Muñiz, Montes-Peón, Vázquez-Ordás, 2009, 981), or a combination (Hadjimanolis, Boustras, 2013, 52-53) were measured. In contrast to the aforementioned studies, some studies dedicated focus on the assessment of actual and perceived risks. Liu and Hammitt (1999, 266-267) differentiate between perceived risks of “disabling injury” or “death”, McLain (1995, 1731-1732) assesses amongst others danger and the distribution of risk exposure for every employee, Huang, Chen, Rogers, and Krauss (2003, 253) used a one item scale to measure the employee’s estimation of the probability of getting injured on the job. Furthermore, two studies assessed the occupational health and safety using the construct of psychosocial safety climate (Dollard, Bakker, 2010; Law, Dollard, Tuckey, Dormann, 2011). One study measured job demands, e.g., risks and hazards, and job resources, e.g., safety climate (Nahrgang, Morgeson, Hofmann, 2011, 2). The operationalization of occupational health and safety as well as the variables productivity, employee motivation, and employee satisfaction are demonstrated in Table 6.

Table 6. Operationalisation of Occupational Health and Safety, Employee Motivation, and Employee Satisfaction.

Operationalization of	Occupational Health and Safety	Productivity	Employee motivation	Employee satisfaction
Authors				
Dollard, Bakker, 2010	Psychosocial safety climate (4 items)		Engagement (2 items)	
Fernández-Muñiz, Montes-Peón, Vázquez-Ordás, 2009	Safety policy (4 items), employees’ incentives (5 items), training in occupational hazards (9 items), communication in prevention matters (4 items), preventive planning (11 items)	Productivity (1 item)	Employee Motivation (1 item)	
Hadjimanolis, Boustras, 2013	Occupational health and safety policies and programs (5 items), safety climate (6 items), safety performance (4 items)			Employee satisfaction (3 items), organisational commitment (5 items)
Huang, Chen, Rogers, Krauss, 2003	Perceived injury risk (1 item)			Employee satisfaction (2 items)
Kilic, Selvi, 2009	Occupational health and security risk factors (25 items)			Employee satisfaction (20 items)
Law, Dollard, Tuckey, Dormann, 2011	Psychosocial safety climate (12 items)		Engagement (9 items)	
Leoni, 2010	Exposure to hazards (10 items); job characteristics (13 items)			Worker satisfaction
Liu, Hammitt, 1999	Perceived risk of disabling injury (20 items), perceived risk of death (20 items)			Rework intentions (1 item); quit intentions (1 item)
McLain, 1995	Danger (6 items), perceived risk (1 item), risk exposure distribution (4 items), economic value of health and safety (1 item)			Workplace satisfaction (6 items), overall employee satisfaction (3 items)
Mitropoulos, Cupido, 2009	Safety measures (10 items)	Work pace including time for reworking mistakes		

Operationalization of	Occupational Health and Safety	Productivity	Employee motivation	Employee satisfaction
Authors				
Nahrgang, Morgeson, Hofmann, 2011	Job demands (risks & hazards); burnout, job resource (safety climate)			Engagement (employee satisfaction, satisfaction with organisation, organisational commitment)
Shikdar, Sawaged, 2003	Occupational health and safety compliance, hazard analysis, task analysis, ergonomic assessment	Productivity, absenteeism, lost work days, low work quality		Dissatisfaction
Yeow, Nath Sen, 2003	Ergonomic interventions	Cycle time, productivity		

None of the studies reviewed analyses occupational health and safety and its relationship to all three variables. Two studies analyzed the influences of occupational health and safety on productivity and employee motivation or on productivity and employee satisfaction, respectively. Three studies founded their proposed theoretical models on the job demands-job resources model; two of these expanded the job demands-job resources model with the construct of psychosocial safety climate.

With regards to the results of the studies, occupational health and safety has a positive influence on productivity (Fernández-Muñiz, Montes-Peón, Vázquez-Ordás, 2009; Yeow, Nath Sen, 2003) or can be seen as an indicator for productivity related problems (Mitropoulos, Cupido, 2009; Shikdar, Sawaged, 2003). Employee motivation is also positively influenced by occupational health and safety. Although the effects of occupational health and safety measures on productivity are stronger (Fernández-Muñiz, Montes-Peón, Vázquez-Ordás, 2009). Furthermore, effects on employee motivation are the result of a particular mediator, e.g., skill discretion and decision authority (Dollard, Bakker, 2010), or job rewards (Law, Dollard, Tuckey, Dormann, 2011). Referring to employee satisfaction, the presence of risks to occupational health and safety does not automatically have significant influence (McLain, 1995; Nahrgang, Morgeson, Hofmann, 2011), whereas insufficient information about health and safety risks (Leoni, 2010) or inappropriate safety measures decreased employee satisfaction (Hadjimanolis, Boustras, 2013; Kilic, Selvi, 2009). Health and safety risks which are perceived as low resulted in high levels of employee satisfaction (McLain, 1995). The perception of safety risks as high resulted in an increase of employees' intentions to quit the job and decreased intentions to continue with it (Liu, Hammitt, 1999).

5 Discussion

Despite of the little number of studies reviewed, research from the USA is presented by five articles and can therefore be considered as predominant. With regard to the distribution of articles over time it can be denoted that the majority of eleven articles were published after the year 2000. Only two articles were published before. This unequal distribution could be attributed to the development of information and communication technologies (ICT) in the late 1990s. The latter may have awoken awareness for occupational health and safety needs. At the same time, ICT facilitated the access to and the processing of data for researchers. Contrary to the focus of our paper on service firms, we included both manufacturing and service firms in our review. In fact, there were more studies carried out in services than in manufacturing. It could be assumed that the development and fit of regulatory frameworks on occupational health and safety in manufacturing is more advanced than in services. This in turn could be due to the industrialization that preceded the ongoing service revolution. Apart from that, the distinction between manufacturing and services when examining occupational health and safety from an employee's perspective may be unnecessary. No matter in what kind of industry people are working, employees offer their manpower as a kind of a paid "service" to a firm. From this perspective, there is no occupational health and safety for manufacturing or service firms. Instead there is occupational health and safety tailored to the specific needs of employees on basis of the core activities they have to do at their work. This coincided with the findings of Shikdar and Sawaged (2003, 569). The minor presence of qualitative approaches in the reviewed studies can be attributed to the higher acknowledgement of quantitative studies in research (Tashakkori, Teddlie, 1998, 3-13).

Further examination of the operationalization of occupational health and safety revealed that there are two theoretical approaches which appear to be influential. Both were represented within the articles reviewed. The first one is the job demands-job resources model (Bakker, Demerouti, 2007; Demerouti, Bakker, Nachreiner, Schaufeli, 2001; Schaufeli, Bakker, 2004) that assigns risk factors threatening occupational health and safety to either job demands or job resources. During earlier stages of this systematic literature review, we came across several researchers who used the job demands-job resources model as a foundation for their studies focusing on specific target groups, e.g., injured

union and non-union workers (Gillen, Baltz, Gassel, Kirsch, Vaccaro, 2002), workers on offshore installations (Nielsen, Mearns, Matthiesen, Eid, 2011), or cabin crews (Chen, Chen, 2014). However, latest research proved the job demands-job resources model as being a valuable tool for the analysis of factors influencing, e.g., the safety performance of employees taking into account participation and compliance to safety measures (Turner, Stride, Carter, McCaughey, Carroll, 2012) or employees' emotional exhaustion (Li, Jiang, Yao, Li, 2013).

The second theoretical approach expands the job demands-job resources model. The concept of "psychosocial safety climate" is introduced and seen as a preceding factor of job demands and job resources (Zohar, 1980; Zohar, 2003). The concept of "psychosocial safety climate" can be denoted as "*freedom from psychological and social risk or harm*" (Dollard, Bakker, 2010, 580). It constitutes a combination of aspects tackling the protection of the physical and psychological health of employees as well as their social well-being (Dollard, Bakker, 2010, 580). It was proved to be a predictor of psychological strain (Dollard; Opie; Lenthal; Wakerman; Knight; Dunn; Rickard; MacLeod, 2012), workgroup distress (Dollard, Tuckey, Dormann, 2012), and injuries occurring at particular work environments such as farming (Glasscock; Rasmussen; Carstensen; Hansen, 2006). The relationship between occupational health and safety and productivity appears to be manifold. It was stated that occupational health and safety measures unfold a positive influence on productivity. But it can be argued that pushing productivity increases the number of accidents and injuries and, that the work pace must fit the tasks that have to be accomplished (Filler, Golbe, 2003; Shikdar, Sawaqed, 2003). Mitropoulos and Cupido (2009) conducted a case study and confirmed this argument with their findings. They compared two framing crews and came to the conclusion that high productivity does not necessarily goes together with an elevated work pace. Instead, they found out that one framing crew took more time for specific tasks than the other but experienced no accidents and spent less time for the reworking of mistakes.

6 Implications for Future Research and Practitioners

This systematic literature review revealed that there is a substantial basis of research within the field of occupational health and safety. However, there were only few studies that analyse occupational health and safety together with productivity, employee motivation, and employee satisfaction. Therefore, future research should focus on these variables. Also quality issues may be of relevance and should be taken into account. Crucial for future research will be the definition of the concept of occupational health and safety. Our review showed that occupational health and safety comprises several dimensions of health and safety in the workplace ranging from perceived risks, actual risks, communication and training, and safety measures or combinations (see Section 5). When developing a definition for occupational health and safety, regulatory frameworks on occupational health and safety and the specific safety needs of employees that go beyond the minimum set of legal regulations have to be considered. A uniform definition of occupational health and safety would add value to studies conducted in the future. It would enable researchers to develop an appropriate scale for measuring occupational health and safety. Moreover, comparisons between firms and their occupational health and safety systems could be realised. Even the employment of meta-analytic approaches might be facilitated. While interdependencies between productivity, employee motivation, and employee satisfaction are a constant issue in service research, occupational safety and its interdependencies is poorly researched. In fact, the majority of articles that we came across during this review evolved from ergonomics, industrial science and safety science.

Contrary to our assumption, practitioners seem to have recognized the importance of protecting their employees against occupational health and safety risks. Still, occupational health and safety management systems are not a natural consequence, especially in developing countries (Shikdar, Sawaqed, 2003).

7 Limitation of the Systematic Literature Review

This systematic literature review involves several limitations. Regarding the search process our initial search resulted in 1,707 hits. In comparison to other systematic reviews carried out in the field of occupational health and safety (see Section 2), this number is rather small. Reasons for this can be twofold. First, this result can be attributed to our search strategy. Some search terms were exclusively employed for the search in the titles of publications and others exclusively in the search of full texts of publications. However, our initial search contained approximately 1,000 duplicates. The proportion of 60% of duplicates can be considered as an indicator pointing at the fact that fewer databases might have been sufficient. Second, when defining the search terms, we only considered synonymous expressions of occupational health and safety. Synonyms for the search terms *productivity*, *motivation*, and *satisfaction* were not defined and employed in the search. With regard to the articles finally included in the review, synonyms for productivity, e.g., performance, for motivation, e.g. engagement, and for satisfaction, e.g., rework or quit intentions, coexisted. Because of the high proportion of duplicates, we did not conduct a retrospective, e.g., by analysing the reference lists of included articles, nor a prospective search, e.g., using the "cited by" function in Google Scholar. Still, we spot-checked the reference lists of four of the finally included articles. More than three quarters of references containing occupational safety or one of its synonymous expressions in the title were already covered by our initial search which strengthens our point. The review is restricted on articles that were published in academic journals only. Academic journals publish the latest state of the art of particular research areas. Further, they can be regarded as reliable sources that maintain a relatively constant level of quality. By this constraint, we also excluded conference proceedings

from our review except they were published in an academic journal. Four non-English texts were excluded from the review. Making up only 0.2% of the initial search results, the language bias caused by the exclusion of these articles is rather small.

8 Conclusion

By this systematic literature review we aimed to find out which interdependencies exist between occupational health and safety and productivity, employee motivation, and employee satisfaction. We could confirm the existence of interdependent relationships between these variables. Further, these interdependencies could be observed in different industries. The substantial lack of a homogeneous definition of what it means for a firm to apply and perform occupational health and safety, complicates the generalisation of findings.

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The role of quality certifications in exports of Chilean information technology services

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Information technology (IT) services have been a fast growing category of Chilean exports over the past decade. A parallel trend has been the spread of different types of quality certifications (QCs). This paper explores the hypothesis that the export performance is linked to the adoption of QCs to demonstrate capabilities to foreign clients. An alternative hypothesis is that QCs are mainly motivated by efficiency improvements. These hypotheses are explored using a semi-structured questionnaire which was sent to all 110 members of the Chilean Association of IT services firms. With a return rate of 38%, results suggest most firms adopted QCs to cut costs rather than improve their status before foreign buyers.

1 Introduction

Information technology (IT) services have been one of the fastest growing sectors of the Chilean economy over the past decade.¹⁴³ From 2001 to 2011, the value of its sales grew 14% per year on average. During the same period, the number of firms almost doubled from 580 to 1,032. Also, employment more than doubled from 16.7 thousand to 37.5 thousand persons engaged (National Statistical Institute, Encuesta Estructural de Servicios Anual). Exports grew at an average annual rate of 18.3% during this period, reaching US\$ 206 million in 2012.

Several factors may explain the rapid expansion of Chile's IT sector. First, there has been a high demand for IT services in the economy that aimed to increase its productivity and competitiveness. One expression of this was Chile's high investment rate in IT in 2012 (2.1% of GDP), which was among the highest in Latin America, according to the International Data Corporation. Second, the country has introduced several public-private initiatives (encompassing government institutions, business organizations and academia). These are aimed to modernize the public sector, reduce the productivity gap between small and large enterprises through the use of IT, and increase the attractiveness of Chile as a platform for IT offshore services for the rest of Latin America. A third factor has been the rapid spread of broadband in the country (Rivera von Hagen, Marinao and Mulder, 2014).

A parallel trend in Chile has been a fast adoption of different types of quality certifications (QCs). Within this sector, the most common QCs are Capability Maturity Model Integration (CMMI), ISO 9001 (a multisectoral standard) and IT Infrastructure Library Information (ITIL). Although there is a relatively abundant literature on the contribution of standards to goods trade, evidence on their role in IT services trade is limited to a few cases in India.

This paper explores the hypothesis that the rapid expansion of the Chilean IT sector's exports is linked to the adoption of international quality certifications (QCs) as a means to reduce information asymmetries between sellers and foreign buyers. This signal effect should directly boost exports. An alternative hypothesis is that firms adopt QCs to streamline procedures and cut costs, which does not directly impact on exports. Due to a lack of detailed data on Chilean IT firms, it is not possible to do econometric analyses to test both hypotheses. Instead a special survey was carried out. This study reports some exploratory results of a special survey conducted among the 110 members of the largest IT service producers association.

The survey's results provide some first answers on the use and motivations of QCs by Chilean IT producers. It turns out the majority of firms that answered the questionnaire have adopted some kind of certification to reduce costs and few have incorporated QCs to improve their status vis a vis foreign clients. The latter may result from the fact that most exports are to other Latin American countries, of which currently few require these QCs.

The structure of this paper is as follows. The next section presents the main types of quality certifications and some aggregate data of their adoption in Chile and other countries in the region. Section 3 reviews theoretical arguments and some empirical evidence on how standards may contribute to international trade in IT services. Subsequently, the role of standards in the Chilean IT sector is explored through a semi-structured questionnaire, which was sent to all 110 members of the Chilean Association of IT services firms (ACTI). The final section concludes and provides suggestions for future research.

2 Quality certifications and their use in Chile and neighbouring countries

There are different types of QCs that IT producers can adopt to improve the quality and excellence of their services and products. Standardization (normalization) and certification were first developed in manufacturing and agriculture, but

¹⁴³ IT services include computer equipment consulting; computer programme editing; computer programme consulting; computer programme supply; data processing; maintenance and repair work for office machinery; accounting and information; and activities related to databases and the online distribution of electronic contents (IMF Balance of Payments Manual, Fifth Edition).

have spread to the IT services industry over the past two decades. Standardization refers to a process by which the service features are reflected in a document also known as “Standard”. Certification relates to the result of a process in which an independent certification entity examines the conformity of a service according to the requirements of the standard. Its approval means that the production process and final product of IT services meet a minimum quality level (Castagnino, 2006).

Standards are developed within specific countries and at the international level. As this study focuses on the role of standards in exports, the focus is on those requirements used by multiple countries. For the IT services industry, specific international certifications exist that apply to any organization independent of its size.

One of the most widespread families of standards and guidelines for the quality of management systems within the IT services industry is the norm 9000 of the International Organization for Standardization (ISO). It has been adopted by over 90 countries worldwide (UNCTAD, 2012). The ISO 9001 has a multisectoral character and it is applied in companies engaged in service design, production or use. Within the ISO norms, there are also specific standards for IT services which deal with specific requirements not covered by the general rules. Examples are ISO 27001 for information security, ISO 20000 for IT service management, and ISO 22301 for business continuity.

Other common international quality standards are CMMI and ITIL.¹⁴⁴ The Capability Maturity Model Integration (CMMI) was created in 2007 by the Software Engineering Institute of Carnegie Mellon University in cooperation with the US government. This maturity model integrated internal processes of service providers of the US government in order to improve their quality. This reference model contains a set of practices aimed at improving the software process maturity and other areas of an organization’s information technologies. This model considers the improvement of IT processes as a gradual process, and defines five levels of maturity. For its part, the ITIL model, or IT Infrastructure Library Information, emerged in the 1980s in the Office of Government Commerce (OGC) in the United Kingdom. The ITIL comprises standardized processes for planning, delivery and support of IT services. In its latest version (ITILv3 2011), standards are structured in five areas, which cover the entire life cycle of IT management services. Each area presents guidelines on the design, transition, operation and continual service improvement.

The aforementioned models have several commonalities but also differences. For example, the ITIL and CMMI models have a similar philosophy of continuous improvement of IT services focused on improving conditions of people, processes and products as well as in process maturity. CMMI and ISO 9001 models have the same principles and approach to quality management process of continuous improvement and process management. Companies often implement CMMI and ISO 9001 as complements. Table 1 compares the three models in terms of goals, advantages and disadvantages.

Within the region, Chile is one of most advanced countries with regard to the adoption of these QCs. For example, in this country 230 ISO 9001 certificates per 1 million population were issued in 2012, compared to 220 in Uruguay, 212 in Colombia, 161 in Argentina, 131 in Brazil and 47 in Mexico (2012 ISO Survey, www.iso.org/iso/iso-survey). With regard to CMMI, Chile had 0.6 firms per 1 million population with this certification in 2012, compared to 0.4 in Mexico, 0.2 in Argentina and Colombia, and 0.1 in Brazil (<https://sas.cmmiinstitute.com/pars/pars.aspx>).

In addition to these general statistics, some surveys have been carried out by software and other IT services business associations in the region. In Argentina, the Chamber of Software companies and IT services (CESSI), with approximately 600 member companies, conducts a survey every semester to assess the development of the IT sector. The March 2014 version of the survey was answered by 89 companies, of which 48% export (CESSI, 2014). Three quarters of the respondents informed they had adopted both international and local QCs. In particular, 69% of the respondents had ISO 9001, 13% had ISO90003, 9% had CMMI and 3% had ISO 27000. Several firms have adopted multiple QCs. Their adoption has been promoted by a software law, which provides tax benefits to companies if they are certified. Another stimulus was the support by a European Union SME program called AL-INVEST, involving micro, small and medium enterprises in Greater Buenos Aires. The National Institute of Industrial Technology (INTI) also promotes the adoption of national QCs.

¹⁴⁴ For more information, see Framework Information Technology Infrastructure Library (www.itil-officialsite.com/aboutitil/whatisitil.aspx) and Capability Maturity Model Integration. <http://cmmiinstitute.com/>.

Table 1. Comparison of CMMI, ISO 9001 and ITIL.

	CMMI	ISO 9.001	ITIL
Focus of organizations	Organizations developing software-based systems	Suppliers of any type of product or service	Providers of IT services
Objectives	Provide best practices for software development, systems, products, integrated processes, and acquisition.	Requirements for the establishment of a quality system.	Framework for organizing the processes of IT service provision.
Pros	Designed specifically for IT industry; provides guidelines for improvement through processes throughout the organization; compatible with other standards such as ISO and ITIL; model with continuous improvement	Recognized internationally; required in both private and public sphere; applicable to organizations of various industries and sizes; not specific for IT industry, but has specific IT standards (ISO 27001, ISO 20000)	Well established and internationally recognized for IT service management; Maps entire life cycle of IT service; supports the ISO standard 20000
Cons	Complex and demanding model that is costly to implement; requires highly trained staff to manage the system.	Not a standard specified for IT organizations; costly to implement, allows creation of slow processes and future needs for staff	There is no certification oriented organizations; exclusive focus on IT services

Source: UNCTAD (2012).

In Colombia, an evaluation of the IT sector was conducted by the Colombian Federation of Software Industry and Information Technology in 2012 (Fedesoft, 2012). A questionnaire was sent to 5,512 enterprises of which 1,120 companies responded. Of all companies surveyed, 162 had some type of certification. Half of this group had ISO 9001 certification and 12% CMMI certification.

In Uruguay, the 2009 annual survey of the Uruguayan Chamber of Information Technology (Cuti), with 300 member companies, shows that 20% of companies have some type of certification or it is in the process of obtaining one. Regarding those which have certification, 52% has ISO 9001 certification, 19% has CMMI certification, 8% has ITIL and the remaining 21% has other certification. Of those companies that are in the process of certification, 52% were preparing for ISO 9001, 7% for CMMI and the remaining 41% for other QCs. In this country, the Inter-American Development Bank (IDB) helps small companies with export potential to obtain QCs.

3 Theories and evidence on the role of QCs in exports

Many studies have assessed how QCs may enhance the performance and exports of goods producers, but those on the IT services industry are mostly limited to the case of India. This section reviews both the theoretical arguments and empirical evidence on this issue.

The causal relationship between QCs, on the one hand, and firm performance and exports, on the other, runs both ways. This dual relationship can be described by three theories: signaling theory, process efficiency theory, and institutional theory (Gopal and Gao, 2009). All three contribute to explain why a firm wants to obtain a QC and what potential benefits it receives from certification. In particular, they show how a firm's performance, approximated by average costs and exports, influences its decision to adopt QCs. Moreover, they show how the adoption of QCs in turn may affect average costs and exports.

The signaling theory emphasizes the role of information asymmetries between buyers and sellers, which is particularly important as IT services are intangible. Buyers have insufficient information to judge the quality of sellers, in particular in offshore destinations. Also, sellers lack instruments to demonstrate their capabilities to clients. In this context, a third-party providing a QC can give a signal of capability that distinguishes a firm from its competitors. If a signal is to separate high-capability from low-capability producers, its cost of adopting a QC should be low enough for the former to acquire the signal and high enough to prevent the latter from doing so. Typical indicators of high-capability sellers are low average costs and high exports. Once the QC is adopted, demand and exports are expected to increase. However, average costs will not change significantly, as QCs are only granted to firms that already performed well.

The process efficiency theory states that firms want to acquire QCs to optimize and standardize processes, improve service and product quality, and worker productivity. The motivation to obtain QCs depends on expected future benefits arising from improved internal firm efficiency. Therefore, the higher average operating cost, the higher the willingness to obtain certification. Once a QC is obtained, it is expected that the average cost will fall and worker productivity increase. According to this theory, there will be no direct effect on sales and exports from certification. However, there may be indirect benefits, as better management will improve the use of scarce resources to increase revenues.

From the viewpoint of institutional theory, firms adopt QCs to gain legitimacy in their home market and abroad. This is a demand-side argument. The more firms are exposed to the norms of export markets, the more likely they are to adopt processes or norms that are considered legitimate. According to this theory, a firm's cost performance does not matter for the decision to adopt a QC, as institutional norms prevail for all firms in a market. Once a QC is adopted, the institutional argument foresees no improvement in sales and exports. This is because the adoption of a QC is seen as a necessary condition for a business to compete in a market, but not a determinant for sales as these depend on a firm's resources and technology. The average cost of adopting a QC is expected to be higher for young firms than old ones, as the former face fewer institutional constraints and can more easily adapt their organization. The above theories are summarized in Figure 1.

The empirical evidence for the three outlined theories and corresponding hypotheses is mostly supportive (Gopal and Gao, 2009). This evidence is drawn not only from studies on IT services firms, but also on firms in other services sectors and manufacturing. Moreover, Gopal and Gao (2009) also tested the hypotheses using data on 220 large and export-intensive software firms in India for the period 1997 to 2002 in relationship to the CMM certification. Their results show that firms with lower costs are more likely to require CMM, which is consistent with the signaling theory but against the efficiency theory. Another result is that firms that export more adopt more quickly CMM, confirming the signaling and institutional arguments. Once the QC is obtained, the authors find a strong positive impact on exports, being consistent with the signaling argument but not with the efficiency and institutional hypotheses. The effect on exports is strongest in the first year after the QC adoption, but fades afterwards. Two surprising results are: i) there seems to be no difference between early and late adopters with respect to average costs and exports, and ii) the adoption of CMM does not affect the average cost of early or late adopters, maybe because the analysis does not consider quality improvements. In short, QCs mostly represents a signal of a better quality of the seller, with most benefits arising from sales rather than cost reductions.

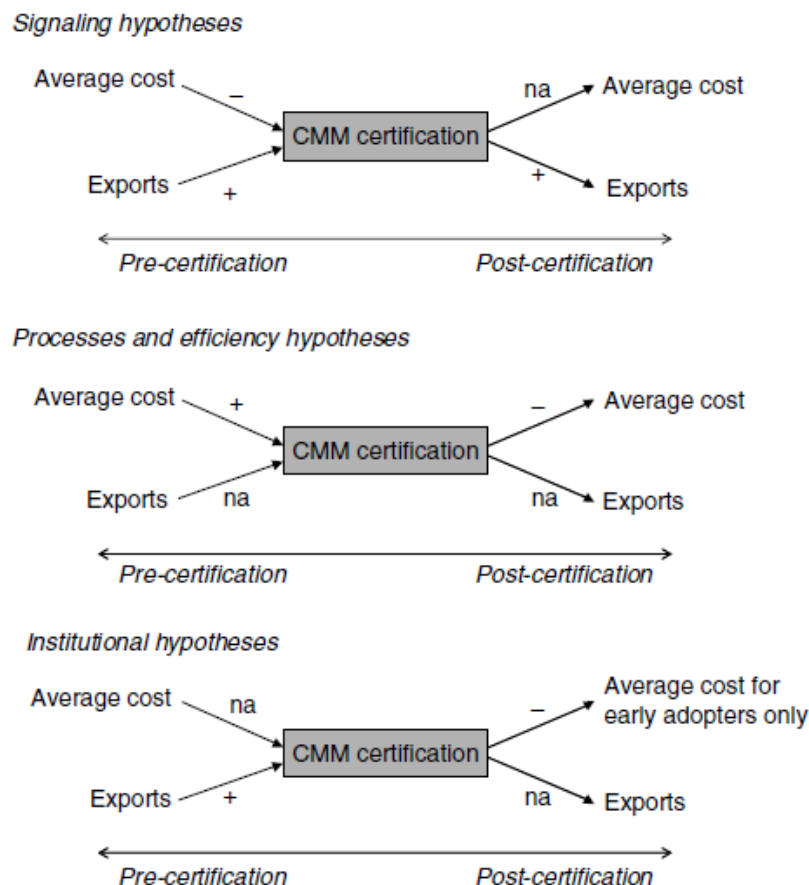


Figure 1. Theoretical relationships between CMM, average costs and exports.

Source: Gopal, A.; Guodong, G. (2009): Certification in the Indian Offshore IT Services Industry. *Manufacturing & Service Operations Management*. Vol. 11, No. 3, Summer, pp. 471–492.

Other studies also confirm some of the above hypotheses. Using 1996-1997 revenue and employment data for a sample of 95 export-oriented Indian software firms, Arora and Asundi (1999) indicate that the main advantage of the adoption of ISO 9001 certification is to show to foreign customers that software processes are defined and documented. In turn, this allows these companies to get better and more profitable contracts. However, to the extent a larger share of firms gets certified, the potential of the signal diminishes. On the basis of a questionnaire responded by 424 Indian software

firms, Ankur and Gupta (2011) confirm the above process and efficiency hypothesis. Firms that adopted CMM or ISO 9000 certifications show better operating and human resource performance, and higher productivity than non-certified firms.

In a study on how certification can promote Spain's software industry, the National Institute of Information Technology (2008) interviewed small companies on their reasons to implement a QC. For them, certification is mainly motivated by the desire to reduce costs (73%), improve client satisfaction (52%) and satisfy customer requirements (49%). The main benefits after implementation are better service quality (48%), higher sales (47%) and increased competitiveness (38%). In the case of large companies, the main motivations for QCs are the satisfaction of customer requirements, standardization of processes and marketing abroad (signaling). The most common QCs are CMMI for large and medium sized enterprises and ISO 9001 for all companies.

Beyond the software and IT services industry, many studies have been carried out on the impact of QCs on trade. Clougherty and Grajek (2013) assess the impact of the diffusion of ISO 9000 on trade between 91 countries from 1999 to 2005. Their evidence supports the signaling hypothesis, as high certification levels in trading partner countries reduces information asymmetries and allows for a better organization of vertical relations in bilateral trade relationships. Also, the competitiveness of exporting countries improves with the adoption of ISO 9000. Another interesting finding is that exports of developing nations which lag behind in the adoption of the QC to developed countries where this QC is widespread are dampened.

In a literature review on standards and goods trade, Swann (2010) shows eight linkages between the two (see Figure 2). First, standards reduce the variety of goods being traded, which in turn cuts transaction costs. Examples are pallets and container sizes. Second, standards reduce transactions costs and promote the division of labor, outsourcing and off-shoring. Third, standards are a carrier of codified knowledge, which is similar to the signaling argument above. Examples given above are ISO 9000, which is the most adopted standard world-wide. Fourth, good institutions can promote trade as they have larger informational and conformity capacities. Fifth, standards promote network effects and innovation, as is the case for example in information and communication technologies. Sixth, standards may promote a more accurate measurement of intermediate inputs and other products, which in turn also favors innovation. Seven, standards may raise the quality of products, but also may increase the cost of compliance and therefore constitute a trade barrier. Finally, standards promote trust and therefore reduce transaction costs and promote trade.

The same author also reviews the empirical evidence on the links between standards and trade. Most of the reviewed econometric results show a positive relationship between international standards, exports and imports. However, studies show both positive and negative relationships between national standards and trade, which show that national barriers may constitute a trade barrier.

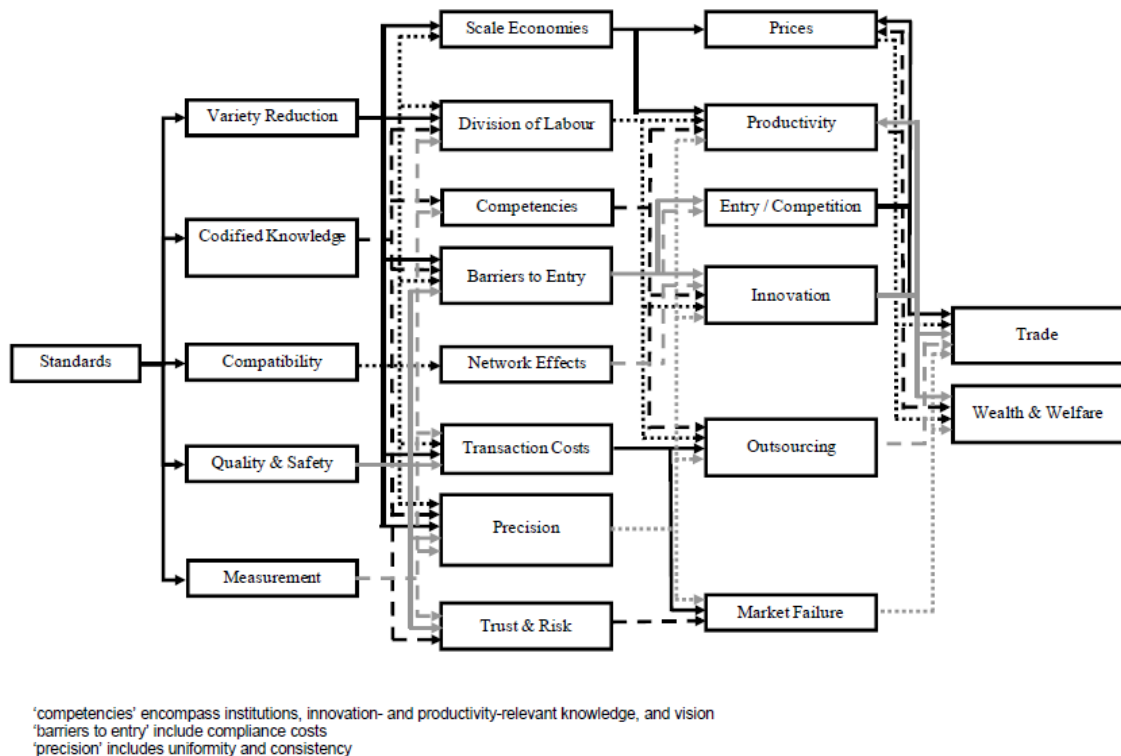


Figure 2. Theoretical links between standards, trade, wealth and welfare.

Source: G. P. Swann, (2010): International Standards and Trade: A Review of the Empirical Literature. OECD Trade Policy Working Papers, No. 97. Paris: OECD Publishing.

To sum up, certification is a tool to enhance a firm's competitiveness in the global market. In this way, a QC provides a guarantee of an internationally recognized and independent entity, with the quality requirements defined in its parameters. This certification allows the development of exports with higher value added and ensuring a better quality service; which undoubtedly raises customer satisfaction, and increases long-term buyer-seller relationships.

4 The questionnaire and results

As detailed data on the adoption of QCs and performance measures of IT services producers are lacking in Chile, which makes an econometric assessment impossible, a special survey was conducted instead for the purpose of this paper. This survey's goal is to get an impression on how many firms have adopted QCs, what are their motivations for doing so, and what are the (potential) benefits.

4.1 Design of the questionnaire and target group

A sample list of questions was prepared in light of the aforementioned literature survey. These were sent to two companies and two academics to assess their relevance, clarity, and un-ambiguity. This ensures the relevance of the questionnaire. The questionnaire is qualitative and consists mainly of closed questions with the option to add comments as a way to collect additional information (see the Annex).

In turn, the questionnaire was sent by e-mail to all 110 member companies of the Chilean Association of IT services firms (ACTI). This is the main business association in the IT sector in Chile, including companies producing hardware, software, training, hosting, systems integration and Internet services.¹⁴⁵ The distribution of the questionnaire was followed up with on average 4 phone calls and three email reminders.¹⁴⁶ In total 42 firms responded the questionnaire, which is a response rate of 38%. The information obtained from the questionnaires was synthesized and analyzed. The companies that responded can be grouped into 3 sizes defined in terms of their annual sales in 2012 (see Table 2): 21% of businesses are small, 45% medium and 33% large companies.

Table 2. Sales of companies that answered the questionnaire, 2012.

Size	Lower Limit (US\$)	Upper Limit (US\$)	# of firms that replied questionnaire
Small	100,000	1,033,000	9
Medium	1,033,001	4, 132,590	19
Large	4, 132,590	and more	14
Total			42

Source: Authors' calculations based on firm size classification of Chile's Internal Revenue Service (SII) and answers to the questionnaire.

4.2 Outcomes

Two thirds of the sample companies export IT services, whereas one third only sells to the domestic market. As expected, proportionally fewer small firms export than those selling to the local market. Within the group of firms that export, 14% are small companies, 50% are medium-sized companies and 36% are large companies. Regarding to the number of years the company is exporting, this study finds that 29% of companies began exporting less than two years ago, 25% exported between the last two to four years and 46% exported continuously for more than four years. Only 8% of companies that export since more than four years are small businesses, 31% are medium-sized companies, while 62% are large companies. With respect to the export revenues, two thirds of companies informed these revenues are less than 20% of total revenues. Another 27% said that their export revenues represent between 21% and 80% of their income. Only about 7% of companies pointed out that more than 80% of their revenues come from exports.

More than half (55%) of all export destinations of IT services are concentrated in South America, followed by North America (23%) and Central America (17%). The American continent accounts for about 95% of total of exports, while Asia and Europe account for the remaining 5%. Within South America, the main destination markets are Peru, Colombia, and Brazil, followed by Argentina (Figure 3). Companies often export to more than 1 market.

¹⁴⁵ Another small business association in the Chilean IT sector is Gechs, which includes mainly small firms (www.gechs.cl)

¹⁴⁶ The authors would like to thank ACTI and their members for their collaboration in this survey.

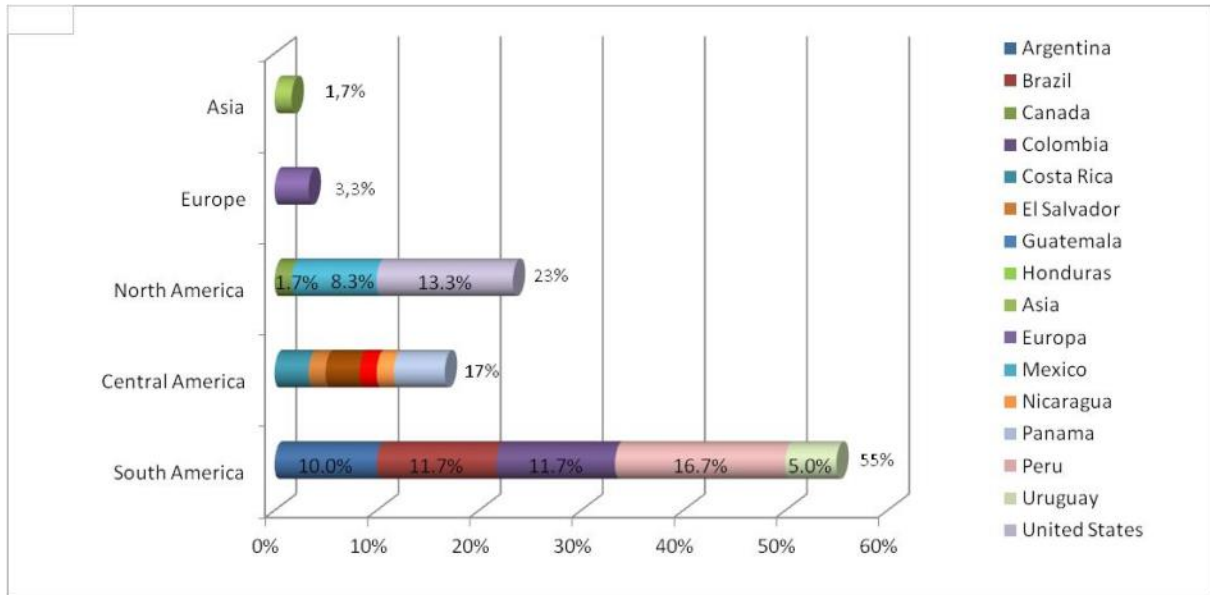


Figure 3. Chilean IT services firms: Destination countries of IT exports, 2012 (Percentage of all firms in survey).

Source: Authors' calculations based on answers to the questionnaire.

The majority (79%) of respondents mentioned they focus on Latin America for the expansion of their exports in the next couple of years. It turns out "nearshoring" is the main business model of Chilean IT service producers. In this context, Peru and Colombia seem to have the largest potential, due to factors such as geographical proximity, cultural and linguistic similarity, and time zone. Other important factors that may explain the preference for the Peruvian and Colombian market is the similarity of these countries in terms of export and production specialization (minerals, retail) and economic development model. This "like-mindedness" was recognised by the signature of the Pacific Alliance in 2011, which also includes Mexico. Its aim is to create an area of deep economic integration and to move gradually toward the free circulation of goods, services, capital and persons.

With regard to the obtained QCs in the IT industry, 69% of the sample has some kind of international QC. With 31%, the ISO 9001 is the main standard. This was followed by CMMI (at different levels) (21% of all firms), ITIL (12%) and PMP (10%). The adoption of security of information certification ISO 27001 is only 7% (Figure 4).

Almost 85% of companies that export since more than 4 years has at least one QC (independent of the size of the company), suggesting a relationship between presence in international markets and certification.

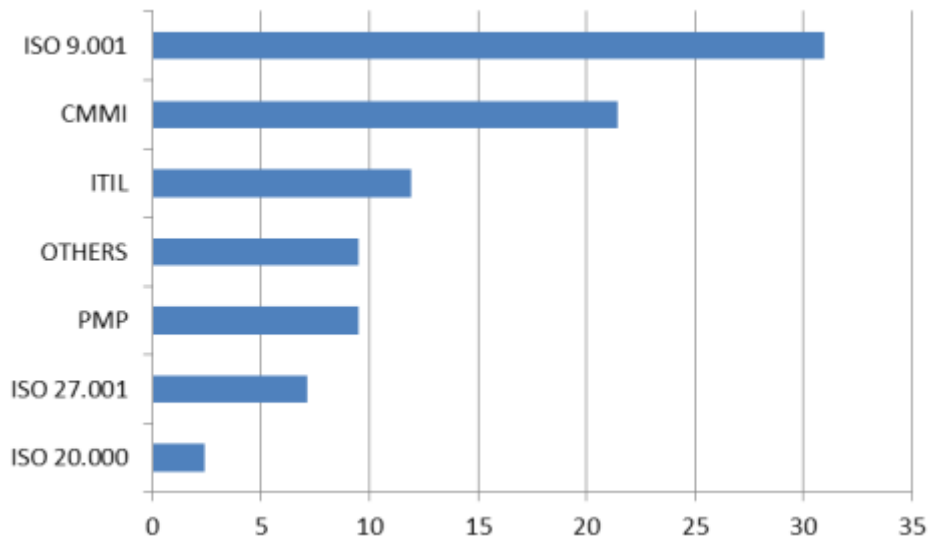


Figure 4. Chilean IT services firms: Adoption rate of Quality Certification, 2012 (Percentage of all firms in survey).

Source: Authors' calculations based on answers to the questionnaire.

As expected, the degree of certification increases with the size of firms. Many small businesses prioritize certified products and platforms (such as Microsoft, Linux, Unix, etc.) and few adopt QCs, in part due to their high cost. Several medium and large companies have implemented internationally recognised QCs. For example, 55% of the CMMI certified companies are medium sized, while the ITIL model is present in 40% of medium sized companies and 60% in large companies.

The majority of firms plan to increase their level and number of QCs. For example, over 40% of small businesses contemplate or show interest in the ISO 9001 standard in the short or-medium term and 22% in the CMMI standard. These outcomes are consistent with the importance that entrepreneurs give to each of these certifications. The first preference is ISO 9001 with 16%, followed by CMMI with 14% and ITIL with 13%. It is important to mention CMMI and ITIL require a high degree of commitment considering the voluminous financial and human resources needed for their implementation.

One of the central questions of the questionnaire with regard to the hypothesis of this paper is the motivation for the adoption of QCs. Almost half (44%) of all companies reported the improvement and standardization of processes as one of the main motivations for obtaining these certifications, followed by the desire to increase the participation in the local market with 32% and increase the participation in the overseas markets with 24%. These answers seem to reject the hypothesis that the main motivation for adopting QCs are "export driven". However, they seem to be in line with the alternative hypothesis of QCs being primarily motivated by the efficiency argument.

Most companies that currently do not export adopt QCs mainly to improve their processes and to expand sales in the local market. Some motivations by domestic market oriented companies to adopt a QC include i) reduce entry barriers to new domestic markets, and ii) compete better with other firms and adapt to the requirements of the bidding procedures of the government and some customers. Other firms mentioned that certification is "... a way to demonstrate the quality of our processes and the delivery of services to our customers and business partners," as well as "the generation of prestige in the market and therefore more competitiveness."

The main attributable benefit from obtaining a QC is an increase in sales. Other benefits are an increase in exports, a reduction of delivery times of projects, and cost reductions. In additional comments, the companies point to an increase in the service quality and customer satisfaction, market differentiation and recognition. Some firms noted that "the standardization process speeds up the learning process and saves time in business processes"; All above are key factors for the management of a company, which are in line with the reasons given for obtaining a certification. This shows the positive expectations of business towards quality certification when starting the process (Figure 5).

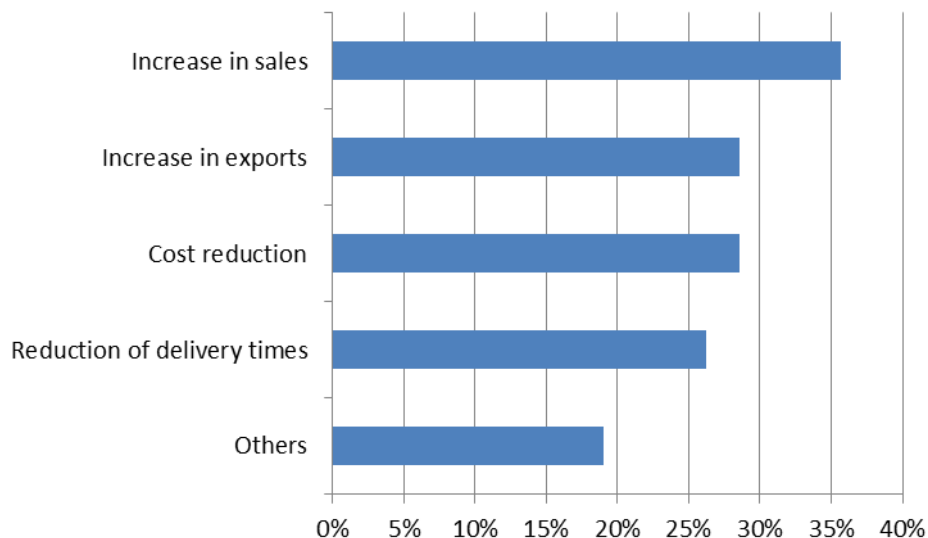


Figure 5. Attributable benefits from obtaining a quality certification
(Percentage of all firms in survey).

Source: Authors' calculations based on answers to the questionnaire.

The survey outcomes show that 58% of companies agree that the lack of quality certification has limited their international expansion. Several companies would like to export to Asia, Europe or the United States, but their lack of adequate QCs limit their participation in bids of the private and public sector, as well as possibilities to sell services to (multinational) companies abroad. The remaining 42% of companies, which feel that the lack of QCs does not constrain their growth, mainly export to Latin American countries or sell to the local market. They argue that QCs are not an exclusive requirement to export to the region, but are aware that at some point in the near future this may change.

A striking outcome of the survey is the lack of knowledge of two-thirds of all companies about the required (or desired) quality certifications in the countries where companies want to export. Within this group, 60% are currently selling their services abroad.

There are several obstacles to obtain a QC. One third of all firms mention the limited time available to invest in a certification process, insufficient human resources (25%) and lack of credit (29%). Only 8% claim ignorance of the benefits of certification, as the main obstacle to obtain certification (Figure 6).

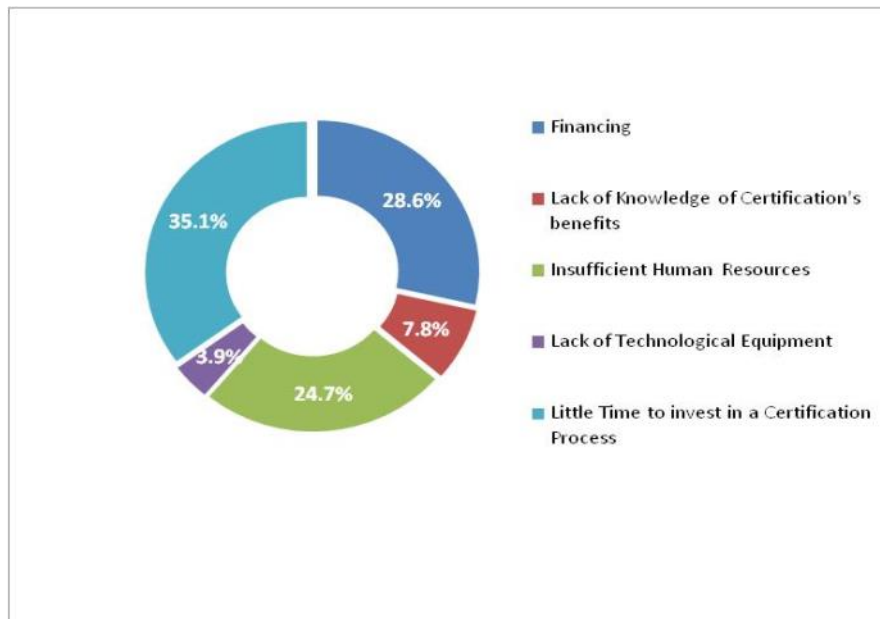


Figure 6. Main obstacles to begin a certification process (Percentage of all firms in survey).

Source: Authors' calculations based on answers to the questionnaire.

Public support to obtain a QC is very low. Almost 80% of companies said they had not received support or incentives for certification. The remainder (21%) acknowledged to have had some kind of support. In 2003, CORFO (a public-sector organization dedicated to promoting entrepreneurship, innovation and growth in Chile), through its development program (PROFO) supported 25 companies to obtain ISO 9001 and CMMI certification. In collaboration with ACTI, another public initiative started in 2012 to promote the adoption of CMMI.

5 Final considerations

The results of the survey show a high presence of some kind of quality certification within Chilean IT service producers and exporters. The most common standard is ISO 9001, because the costs, human resources and time required for the implementation of other QCs are much higher. In the case of small IT services firms, the low presence of QCs are due to their almost prohibitive costs. For this reason, they focus their efforts on the adoption of products platforms.

The answers to the questionnaire seem to reject the main hypothesis of this paper stating that the main motivation to adopt QCs are "export driven", meaning the reduction of information asymmetries between the seller and foreign buyer with regard to the seller's capabilities. Almost half (44%) of all companies reported the improvement and standardization of processes as one of the main motivations for obtaining these certifications, followed by the desire to increase the participation in the local market (32%) and increase the participation in the overseas markets (24%). In sum, the results seem to be in line with the alternative hypothesis of QCs being primarily motivated by the efficiency argument.

Other elements that seem to confirm the rejection of the main hypothesis is the little knowledge about the most important quality certifications in countries where companies want to export. Furthermore, it was observed that the share of exports revenue in total sales is low still relatively low overall.

Regarding the benefits that companies obtain with QCs, most firms agree they help to increase sales. Other benefits are a reduction in service delivery times, the improvement and standardization of processes, and cost reductions of projects. Overall, firms seem to be satisfied with the results obtained from QCs.

On the basis of the literature review and results of the survey, the following recommendations can be made to develop future analysis and policies in the area of QCs in the IT services sector. These findings are intended to better understand the benefits and obstacles of QCs in boosting exports of IT services in Latin America and define types of policies that may promote these goals:

- Incorporate questions on the use of QCs in the annual services survey of the national statistics institute of Chile or surveys on innovation.
- Conduct econometric studies on the links between QCs, exports and firm performance using firm level data, in collaboration with the IT service firms' organizations ACTI and Gechs.

- Investigate causes of the lack of awareness among IT services producers of the importance of QCs in export markets, and implement policies that may support the adoption of market relevant QCs. An example is tax reduction of the costs incurred to implement certain QCs in Argentina and Brazil.
- Develop a guide on the requirements and steps of a certification process.
- Promote partnerships between IT service companies that are already certified and those wishing to become certified.
- Establish a database in the export promotion agency PROCHILE with information on the most appropriate or valued certification in the different countries firms want to export to.

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Internationalization, Integration, and Innovation in Multinational Enterprises in Mexico: Services versus Manufacturing

Redi Gomis, Jorge Carillo

Comprehensive discussion of multinational corporations and their impact on the development of the host country revealed a significant difference between services and manufacturing (Dunnig, 2008). Furthermore, a greater integration in both sectors is occurring, stressing the increasing importance of vertical linkages and inter-sectoral knowledge exchanges between these interrelated branches of the economy (Castellacci, 2008).

The goal of this paper is to document the type of participation by manufacture and services MNCs in the global value chain in Mexico. We compare the “Three I” (internationalization, integration and innovation) in this two sectors based on a face-to-face survey with HR managers. The survey is statistically representative of MNCs located in Mexico.

The hypothesis is that in Mexico, manufacture multinationals have specialized in the efficiency-seeking strategy through exports, while services are focus on domestic market-seeking strategy. It is expected that manufacturing companies maintain a better position both in the global value chain and its impacts on employment due to their global networks, from service MNCs whose primary investment strategy is the domestic market. In other words, higher internationalization, integration and innovation are expected in the manufacture sector as well as better employment conditions. Results shows that these sectors are more hybrid that we expected.

¿Are global enterprises the most socially inclusive? In other words, are the most internationalized companies better integrated into their respective value chains and are the most innovative those that offer better working conditions to their employees? Based on what a significant part of the fundamental literature suggests on the subject, one might be mostly inclined to suppose so, especially regarding manufacturing companies that are presumably more innovative and inclusive than services companies. In reality, however, this is more a provisional judgment than a conclusive one. The empirical evidence is ambiguous enough as to prevent that axiomatic conclusions be established in this respect. Therefore, it constitutes a matter still under discussion and a debate within which this paper seeks to be inserted.

This paper has two main objectives. First, it explores the relationship between economic and social progress. To this end, the behavior of the labor and employment status in multinational enterprises (MNEs) in Mexico is analyzed, according to different levels of internationalization, integration into global value chains, and innovation. It is an empirical analysis based on a 2008-2009 survey of MNEs operating in Mexico conducted by El Colegio de la Frontera (COLEF) (College of the Northern Border).

Exporting global companies are generally associated with the idea that they are more innovative and competitive and, derived from this, have better job performance. Thus, many multinational manufacturing companies are considered to fall into this classification, as opposed to services MNEs, which traditionally focus on the domestic (Mexican) market. Therefore, considering the variables of internationalization, integration into global value chains, and innovation, there is usually a tendency to attribute high scores in these three dimensions to manufacturing MNEs (partly composed of world-class maquiladoras). By contrast, in the case of services companies, the inclination is to identify them with the lowest levels in these dimensions, particularly because of their domestic market orientation. This relationship will be explored through a comparative analysis of companies in these sectors, in order to examine if indeed services MNEs have the possibilities and opportunities that they are supposedly attributed. The second objective of the work consists specifically of this.

The structure of this paper is as follows. After presenting the work objectives in this introduction, the following four sections will present: (1) a discussion of the literature about the impacts of globalization on the labor characteristics of MNEs; (2) methodological issues related to the analysis that will be conducted, especially those associated with the nature of the data, as well as the analytical strategies to be followed; (3) proper analysis of the data from the results of the analysis techniques applied; and, finally, (4) some brief conclusions.

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Theoretical and Conceptual Discussion

Although it is quite a commonly used idea, the fact cannot be ignored that it really is difficult to overstate the importance of multinational enterprises in today's economy—both in the developed and relatively less developed countries—taking into account the extent and power of their impact in that arena. Within this same logic, for example, both Dicken (1998) and Sklair (2001) argue that multinational enterprises are the institutions that have influenced more than any other, the globalization process that for several decades has been generated around the world.

One of the main features that has distinguished this process has been the rapid expansion of foreign direct investment (FDI) flows to developing countries, a display largely led by the worldwide reorganization of production networks, precisely of multinational enterprises. In Mexico, for example, FDI has flowed steadily and in significant volumes. Although in 2012 it experienced a significant drop in its investment flows, during the previous ten years, FDI remained relatively steady with an annual average of about 23 billion (CEPAL, 2013:34).

It is perhaps for this reason that in recent years, accompanying these transformations, the debate has been widening and deepening regarding the role-played by FDI through MNEs in the economic, social, and political dynamics of the host countries. This has been a heated debate in the ideological and political arenas. Although logically more nuanced than in these two spheres, the same controversy has also been present in the academic field, facing the arguments of those who are inclined to ponder all the benefits of multinational companies from those who more likely tend to emphasize their disadvantages. Both stances were masterfully summarized by Moran (2000) in the taxonomy of rival models—"benign" and "malign"—of the effects of direct foreign investment on development.

One of the representative effects of FDI is what Lee (2013) calls "the trap of middle-income countries." This is shown in full force when developing countries face an economic slowdown by remaining halfway between low-income exporters and their low technological level, which does not allow them to compete with developed economies. Therefore, following Rodrik (2008), it can be said that in any case it would be better to maintain economic growth on par with technological growth rather than economic growth without support in technological capabilities.

To avoid falling into the "trap of middle-income countries"—or to get out of it if already inside—Lee and Lim (2001) argue three proposals: (1) newly arrived companies should continue with research and development (R&D) activities using already established companies as examples; (2) if applicable, each company should omit certain stages in the R&D pathway that do not benefit it in order to save time; and (3) already established companies should explore their own path to technological development.

In any case, it is important to note that there is certain consensus among specialists with regard to the role that MNEs can play in relation to the transfer of knowledge, the dissemination of best practices, the establishment of standards, and, particularly, technological capacity building (Lee, 2013; Nelson, 2008; Lundvall, 2004). From current discussions, however, the central interest of this work's objectives is related to the impact of MNE activities on the labor market because, as Lundan and Dunning (2008) point out, "almost all actions of multinational enterprises or their subsidiaries tend to directly or indirectly impact the level, quality, growth, stability, and motivation of the labor force" (p. 414). This becomes important in developing countries because, historically, the technological transformation has taken place in the core countries of the world system and in the leading multinational enterprises from the different productive sectors (Pérez, 2008).

Perhaps the most important idea deduced from all these debates about divergent impacts of MNE activities on developing countries is that there is evidence supporting one stance as much as the other. That is, no stance constitutes an unfounded point of view that should be challenged *a priori*. In fact, the phenomenon of the activity of multinational enterprises is varied in its effects, which may be due to: (a) the diversity of situations in which MNEs operate; and (b) that MNEs, rather than a univocal reality, constitute themselves a heterogeneous reality.

One aspect that has gotten more attention is the relationship between export specialization and job creation. In this field, the debate in recent years has focused on knowing whether exporting firms would be more productive and create more and better employment opportunities and wages. Several empirical studies have found that companies that develop internationalization processes have higher levels of productivity than companies that only produce for domestic markets (Tumini, 2011). This author initially refers to the pioneering research of Bernard and Jensen (1995), who analyze the differences between exporting and non-exporting firms. Their purpose was to understand the role that exports play in the structure and dynamics of productivity, employment, and wages. Both authors found that exporting companies show better performance characteristics than non-exporting companies, and present higher levels of productivity, higher growth rates, and higher wages. Although in general the evidence shows a positive relationship between exports and employment, the differentials found regarding the enterprises geared toward the domestic market are not so clear, nor homogeneous.

A similar debate has emerged regarding innovations, an element that enterprises, academia, and government confer high prominence as a development factor. Innovation is not detached from the regional context. Laursen, Masciarelli, and Prencipe (2012) found that social capital that is geographically connected affects the innovative capacity of enterprises. Regional social interaction helps build innovation through the interaction of actors in a region and through the effects of support from trusteeships. In other words, innovation ecosystems are an important matter. Thus, companies that are located in regions characterized by a high level of structural social capital show a higher propensity to innovate. Institutions that serve as local learning centers, universities, research centers, and laboratories, as well as

access to foreign knowledge bases, mainly represented by MNEs, are recognized as the critical success factors in increasing technological capabilities (Lee, 2013).

Innovation does not seem to be linked, as one might think, to social inclusion. Empirical evidence does not show binding actions between these two concepts, but it does in relation to employment. Although the relationship between innovation and employment is highly complex (Pianta, 2006), in general, and according to Tumini (2011), current empirical evidence tends to consider that innovations have an overall positive impact on employment: with regard to non-innovative firms, the most innovative—not only in products but also in processes—tend to be the fastest growing and, therefore, also the ones that expand their employment more.

While not objecting to this idea, García, Rodríguez, and Jaumandreu (2002) complicate, in general, this same relationship between innovation and employment. According to these authors, innovation—basically that of processes—could displace employment, causing its decrease. Although parallel, in turn, and also as a result of this innovation, favorable conditions could be created to generously compensate such displacement. Thus, the significant reduction in marginal costs from innovation processes could easily be transferred to the price of the product. This would expand its demand and, thus, generate a compensatory effect on employment previously suppressed as a consequence of innovation. At the same time, however, these authors emphasize that the role of compensatory mechanisms may be blocked and, in some cases, even completely blocked (García, Rodríguez, and Jaumandreu, 2002: p 117.). The latter would directly hurt employment, not wages themselves; in any event, its negative effects would be temporary, since they would tend to be positive in the long run.

Nature of Data: Analysis and Sample Unit

The nature of the data establishes both limits and possibilities for exploration and analyses. Knowing the characteristics of the information used thus allows a clearer notion with regard to its limitations.

The information that will serve as a primary source for this work originated in a survey of a sample of 171 multinational firms in Mexico—in a universe of 922—carried out between late 2008 and early 2009. The survey took place within the framework of a research project developed in COLEF, with the objective of studying the organizational structure, innovation, and employment practices of MNEs in Mexico. This project, in turn, closely followed the guidelines established by Intrepid,¹⁴⁷ an international network of independent researchers that seeks to consolidate, with input from all participating national groups, a reliable and relatively homogeneous database that allows the production of comparable high-quality analyses of employment policies and practices of multinational enterprises around the world.

The target population of the research is from the operational definition adopted by mutual agreement of the Intrepid group participants. According to this definition, the firms that shall be considered multinational are those that participate in the economy of at least one other country besides Mexico, and have at least 500 total employees, but a minimum of 100 employees in the country where the survey originates.

Due to its methodological implications, one restriction should be more specifically defined. It derives from the adopted operational definition, according to which the *firm* is considered as the sole and total analysis unit. It means—and this is what should first be understood—that all survey questions are addressed to the head of the organization in human resources, not to subordinate or lower-level business units. The notion of firm, in this case, refers to the enterprise's *corporate* structure in Mexico. Thus, for example, while a multinational corporation may have several plants or production units within Mexican territory—with intense activity and dependencies on each other, or relatively isolated and disconnected from each other—according to the definition presented, only one of them, the most important among all, would be part of the sample universe. The information thereby collected would correspond to the conglomerate as a whole and not to each of the separate units that would shape it.

A specification such as this one logically has advantages and disadvantages. Among the most important advantages—besides ensuring the alluded comparability within Intrepid's global database—the following three would be found: (a) prevents duplication, since the information of each firm is collected only once, ultimately providing more consistent conclusions about the processes and phenomena to be analyzed; (b) allows the incorporation of Mexican companies, which are often excluded from studies of multinationals, under the wrong consideration that the latter are only those subject to foreign investment; and (c) do not completely exclude relatively smaller MNEs, because although it is true that the definition includes a minimum of employees—500 globally and 100 for Mexico—it is much more inclusive than sources such as *Revista Expansión*, for example, which incorporates only the 500 largest among its kind.¹⁴⁸

Among the most obvious disadvantages, three stand out: (a) definitely, smaller multinationals would also be lost, in case there were some that because of their size would not be able to reach the minimum number of employees

¹⁴⁷ Intrepid is the acronym for "Investigation of Transnational Employment Practices: An International Database." This network's participants are researchers from nine countries: England, Ireland, Spain, Canada, Mexico, Argentina, Norway, Finland, and Australia. Its members meet approximately every year with the intent to exchange information and outline long-term research strategies, emphasizing comparative studies.

¹⁴⁸ *Revista Expansión* is a biweekly Mexican publication that focuses on issues of economic, financial, and business interests. It is owned by Time Warner. It annually presents, in a special issue, the list in order of the 500 most important enterprises in Mexico.

established by the rule, either at the global or national level; (b) the difficulties to expeditiously find corporations within an ocean of thousands of enterprises with foreign capital registered in Mexico as independent and autonomous company names, although in many instances they really are not; and (c) the loss of the significant heterogeneity that exists within many firms, particularly those that have a more complex organization and multiple units.

The recounting and final identification process of corporations—under the conceptual approach that interested us and from which appropriate criteria for sample selection can be established—was arduous and rigorous. Several strategies were followed.¹⁴⁹ The achievement of the proposed goal implied overall great efforts and major time investment. Even so, the result was satisfactory, since it ultimately allowed the completion of a robust and reliable database of multinational enterprises.

Nonetheless, there are limitations related to the information that was collected and stored in the database that should be noted. One is that, while attempts were made at all times to have a random selection of cases sufficiently representative, there were difficulties in the response rate of the enterprises, which gradually modified these initial selections both quantitatively and qualitatively. The reluctance of MNEs to agree to answer the questionnaire was derived from the simultaneous effect of three situations: (a) the global economic crisis that started precisely in 2008 and worsened in 2009; (b) the growing public insecurity in several states of the Mexican Republic; and (c) the epidemic of the A-H1N1 influenza virus. Another limitation is that, conditioned by the aforementioned, not one multinational company from the primary sector could be interviewed, so its representation was missing from the database. It is difficult to determine how these limitations may affect the validity of the conclusions, but it can be presumed that they will somehow diminish their strength and their power of generalization.

Methodological Strategy

In the first exercise to be developed, “the labor and employment conditions or status” will be considered a dependent variable. The behavior of this variable would be assumed, in this case, to be subject to the influence of the remaining aspects of the company considered earlier in this paper that, in turn, are the independent variables of the model: “degree of internationalization,” “integration into global value chains,” and “innovative capacity.”

The four variables were conceived, at first, as indices obtained from a set of conceptually related indicators whose value would be established by simply adding them. However, both for the convenience of simplicity in the data analysis as well as for the requirements of the technique planned to be used, in all cases their ranges were finally established in only two values (e.g., upper-lower, plus-minus, major-minor, etc.). The average of each index in each of the variables is the cutoff or separation point between these two values, depending on whether it is lower or higher than that average value. Table 1 shows a summary of the variables (indices) considered and, for each, the survey indicators that were used to create them and their related dichotomous values. As can be seen, in the process, a large set of variables was reduced to just four, allowing for more manageable analyses.

Table 1. Variables, Indicators, and Values.

Variables	Indicators	Values
Labor and employment status or condition	<ul style="list-style-type: none"> • Employment dynamics • Employment of college students/graduates • Salary • Level of representation 	<ul style="list-style-type: none"> • Inferior labor environment • Superior labor environment
Innovative capacity	<ul style="list-style-type: none"> • Employment in Research and Development (R&D) • Ties with universities to develop R&D • Search for government support to develop R&D • Existence of reverse innovation 	<ul style="list-style-type: none"> • Less noticeable capacity • More noticeable capacity
Degree of internationalization	<ul style="list-style-type: none"> • Exports • International assignments • Adaptive strategy 	<ul style="list-style-type: none"> • Less internationalized • More internationalized

¹⁴⁹ In an earlier study, published by the *Frontera Norte* journal, we detailed some of the intricacies of the laborious process followed then. It can be consulted in Vol. 23, No. 46, July-December 2011, pp. 35-59.

Variables	Indicators	Values
Level of integration into the global value chain (GVC)	<ul style="list-style-type: none"> • Incorporation of innovations within the GVC, but outside of Mexico • Existence of specific mandates • Trade insertion within the GVC • Degree of independence in decisions 	<ul style="list-style-type: none"> • Lower integration • Higher integration

Source: Authors, 2014.

The relationships among these four variables will be explored from a logistic regression in the particular case of the surveyed MNEs in Mexico. As is known, this is a nonlinear statistical technique that aims to determine the weight of the predictor or independent variables on the probability of occurrence or not of a supposedly dependent event on the variables. In the specific case at hand, this event would be: (a) the existence of some employment and labor conditions above the index average; or (b) its counterpart in the dichotomy, that is, that the employment and labor conditions are below that average value. It should be made clear that the aim is not to conduct an exhaustive study that explains the causal determinants of the labor and employment environment in MNEs in Mexico, since this would far exceed the scope of this work. Rather, it is to estimate with greater precision, both the extent and degree of influence that other factors examined have on the occurrence of the resulting events.

The relationships that are to be explored among the described variables could also be perfectly achieved through other simpler procedures, such as the analysis of contingency tables. However, although it is more complex, there are two advantages of logistic regression itself that make it superior to others and thus more suitable for purposes of the research. One is that the analyses are less biased, to the extent that the effect of each variable is isolated and controlled in the process by the remaining variables that are part of the model. This determines that the results are logically more reliable. The other advantage is that the odds ratios provide the weight with which each of the variables considered affect the outcome; this allows them to be ranked according to the strength of their effect. All this takes place, of course, without completely losing sight that all models are only approximations, as fully accounted in the famous line by George Box, often quoted: “Essentially, all models are wrong, but some are useful” (Box, 1987: 424).

The comparison between sectors followed a similar path. Likewise, a logistic regression was applied, considering the same independent variables as in the previous model, but considering the sector as a dependent variable. The essential idea here is to see how different the manufacturing and services sectors are with regard to this group of factors. Once this point is clarified, whether the employment and labor status has differences in one or the other is ultimately determined.

Analyses of Results

In accordance with the two objectives presented at the beginning, and in correspondence with the methodological strategy subsequently presented, the empirical results of the data used will be analyzed in this section.

Employment Dynamics: Internationalization, Integration, and Innovation

Table 2 shows the logistic regression results related to employment status in MNEs in Mexico (shown in SPSS statistical program output format). As this table shows, the “*superior* employment and labor status” value of the dependent variable was chosen as the *reference value*. This means that, in general, the model compares the probability of occurrence of the other outcome—“*inferior* employment and labor status”—in relation to the reference one. It is known as the *comparison value* because of this. The data in each of the columns have a particular meaning within the model, some of which will be explained in detail as the reader proceeds through the document in the review of information.

Table 2. Multinomial Logistic Regression (Employment Status)
Parameter Estimates (SPSS Program).

Reference Category: <i>Superior Labor and Employment Status</i>		<i>B</i>	Std. Error	Wald	df	Sig.	Exp (B)	95% Confidence Interval for Exp (B)	
								Lower Bound	Upper Bound
<i>Inferior Labor and Employment Status</i>	<i>Intercept</i>	0.34	0.11	10.11	1	.001			
	Highest innovative capacity	-0.38	0.16	5.36	1	.021	0.68	0.50	0.94
	Greater internationalization	1.73	0.18	95.12	1	.000	5.63	3.98	7.96
	Integration into the highest GVC	-0.68	0.15	20.86	1	.000	0.51	0.38	0.68

Source: Survey of Multinational Corporations, COLEF-CONACYT Project #55108, “Firmas Multinacionales en México: un estudio sobre la estructura organizacional, la innovación y las prácticas de empleo” (Multinational Firms in Mexico: A Study of the Organizational Structure, Innovation, and Employment Practices), 2008-2009.

Following the logic of interpretation of the technique used (see UCLA: Statistical Consulting Group), and based on the findings shown in the table, the following is a list of the main ideas that can be drawn from it:

1. The column titled “Sig.” captures whether the findings are statistically significant or not. In all cases, it shows that the value of this parameter was less than 0.05, which would suggest a confidence level greater than 95%. As a result, it can be assumed that all independent variables considered in the model have such an influence on the dependent variable that it can be classified as important, at least in statistical terms.
2. What is the meaning of the influence noted in the independent variables on the dependent one? In what direction is the relationship between the former and the latter established? The column titled “B” defines the regression coefficients that establish the change that should take place in the dependent variable with the changes that have occurred in each of the independent ones, assuming that the others remain constant. The positive or negative sign of the coefficient indicates whether the result will favor the reference value or that of comparison. That is, if it is positive, it shows that the dependent variable has a *direct* relation to the comparison value and *inverse* with that of reference. Conversely, if it is negative, it shows that the direct relation is to the reference value and inverse to the comparison value. Thus, since the *intercept* is positive, it would most generally be expected that the probability that enterprises exhibit an inferior labor and employment status is higher than the probability that they stand out for their superior labor and employment status. The same applies specifically to the “degree of internationalization” independent variable. In this case, the regression coefficient is also positive, indicating that when the internationalization of the company is greater, its labor and employment status is lower. Exactly the opposite occurs in relation to the “innovative capacity” and “integration into the global value chain” independent variables with regard to the direction in which the relationship occurs. When the value of the regression coefficient is negative in both cases, this means that when both the innovative capacity of the company, as well as the degree of integration into their respective chains are higher, then it is more likely that the result is preferably that of a superior labor and employment status, compared to the opposite result.
3. What is the strength of each of these relationships? Which variables have greater influence on the outcome and on which is that influence less? The odds ratios of the coefficients—shown in the column titled “Exp (B)”—help to clarify these questions. If the regression coefficients, previously analyzed, indicated in which group—comparison or reference—it is more likely to fall, the odds ratios, in turn, reveal the scope and strength of that probability. Considering the aforementioned, it can be seen that, of the three independent variables, the “degree of internationalization” is the one that more powerfully influences the dependent variable. Translating the table results, then, it can be said that it is 5.63 times more likely that, as the degree of internationalization of the company increases, working conditions and employment status will worsen rather than improve. While the other two independent variables were also statistically significant, as seen, their impact on the result is not as intense as in the case of the previous variable. Given that there is an inverse relationship between them—keeping in mind that *B* is a negative sign—and based on the odds ratios, it can be said that as the innovative capacity and its integration into the global value chain increase, it is 0.68 and 0.51 times more likely, respectively, that working conditions and employment status in the company will improve rather than worsen.

In summary, one may say that the magnitude and quality of employment, as well as other working conditions, hold some degree of dependence regarding the processes related to innovation, internationalization, and integration of enterprises into global value chains. However, while the innovative capacity and the integration processes into the chains favor the improvement of those aspects related to employment, the strength of their influence is not as intense.

Conversely, the weight of internationalization is more noticeable, but intervening in the opposite direction, as this factor contributes more to the deterioration of conditions related to employment.

The Sector in Action: Manufacturing versus Services

As characteristics or qualities peculiar to enterprises, both the processes of internationalization and integration into value chains, as well as innovative developments, continue to be attributed, at a level of representation, more to manufacturing than to services. This is quite a widespread idea whose origin and persistence would be better understood if the following considerations were taken into account: (a) first, because of the fact that products have usually been privileged when one thinks about innovation. Product innovation, for example, was the dominant factor in the early stages of the conceptualization of innovation; (b) second, because many of the services traditionally have required a direct interaction with the end user, which would demand the presence of the company that provides the services in the consumer market (Álvarez and González, 2009). Hence, it has even been suggested that the objective of direct foreign investment in the area of services has historically been the search for markets (UNTAD, 2004); (c) third, and final, because likewise many of the services, due to their intangible nature, are indivisible and therefore cannot be fragmented into discrete phases. In many cases, this leads to investments becoming independent subsidiaries—as already stated—aimed at conquering local markets and, therefore, generally less integrated into international value chains (UNTAD, 2004). Moreover, as technology in manufacturing in certain sectors progressed considerably (think successful production models such as Fordism and lean production), services had lower technological development. This changed radically with the arrival of the Internet, information technology and telecommunications, and development of semiconductors.

How accurate are these three considerations? To conceive innovation—taken here as an economic function, according to the classical meaning conferred by Schumpeter (1978)—as a result only relative to the product, is a highly restrictive consideration. It is widely accepted that, in addition to the product, innovations can also aim at different business processes, which in this case are also service companies and legitimate carriers of innovations. Moreover, the most innovative companies currently are the service ones. Suffice is to recall that Steve Jobs did not invent the telephone, Howard Schultz did not create coffee, and Mark Zuckerberg did not found the Internet or online databases, but they were able to find new ways to use the phone, serve coffee, and use social networks. Thus, “they transformed their markets” (*Revista Expansión*, March, 2014).

It is not so simple, however, to neutralize those factors that are related to the other two considerations presented earlier; that is, the alleged impediment of services to become international because of the need for face-to-face interaction with the end user, and the alleged indivisibility of activities that comprise it. Recent decades have witnessed a rapid phenomenon of internationalization and fragmentation of services led largely by the extraordinary advances in information technology and communications. The problem is, though, that there are still barriers that would be limiting the global expansion of all or parts of the services.

With the development of so-called new technologies, various contents have been gradually digitized with the potential to be stored and/or sent anywhere in the world within seconds. Books, songs, movies, among others, would be examples of these recent innovations. Relative to the interest of this work, this has two important direct consequences. One is that services have been added continually with the ability to become marketable across borders. The other important consequence is that production of many services could be fragmented to unimagined limits just recently, thereby giving rise to various forms of outsourcing services internationally. The term “offshoring” that came into vogue a few years ago clearly outlines this phenomenon. In some cases, it presumes outsourcing some part of the service, such as the diagnosis of a medical examination or review of a book. In others, the full service is international, including customer service through call centers, or remote monitoring of facilities through electronic means. The speed and depth with which these changes occurred resulted in some considering this as a *revolution* in transit (UNTAD, 2004; Blinder, 2006).

Not all services, however, have the necessary characteristics to become candidates to participate fully in these processes. Legal services, for example, which require local knowledge of specific codes, can be one of them. There may also be technological and idiosyncratic limitations, among others. The important idea here, based on what has been analyzed, is that at least some services MNEs in Mexico should supposedly be prevented from developing internationalization strategies and integrating naturally into international value chains, which would be reflected in the characteristics shown by all.

This leads to the center of interest of this section. Based on the above, one would expect in theory, as an advanced hypothesis, that manufacturing MNEs operating in Mexico have more developed processes of internationalization and integration into their respective chains than services MNEs. But one might ask whether it is really so. How different are the companies that belong to the two sectors in these and other related aspects? Does one or the other truly “produce” different labor and employment conditions?

With the idea of exploring these issues, another logistic regression was performed. Similarly to the previous model, the same independent variables were used in this one. But in this case, and differently, the sector was the dependent variable. The intention is to assess how deeply manufacturing MNEs are related to the services MNEs. In other words, which of the two sectors is more given to developing processes of internationalization and integration into productive chains, and which has a higher innovative capacity. Table 3 shows the results for this new regression. The “services”

value of the “activity sector” dependent variable was taken as a category or reference value, while “manufacturing” is the comparison value.

*Table 3. Multinomial Logistic Regression (Activity Sector)
Parameter Estimates (SPSS Program).*

Reference Category: Activity Sector: <i>Services</i>		<i>B</i>	Std. Error	Wald	df	Sig.	Exp (<i>B</i>)	95% Confidence Interval for Exp (<i>B</i>)	
								Lower Bound	Upper Bound
Activity Sector: <i>Manufacturing</i>	<i>Intercept</i>	0.02	0.11	0.03	1	.087			
	Highest innovative capacity	0.50	0.18	7.51	1	0.01	1.65	1.15	2.37
	Greater internationalization	2.35	0.24	94.00	1	0.00	10.48	6.52	16.85
	Integration into the highest GVC	0.19	0.16	1.46	1	0.23	1.21	0.89	1.65

Source: Survey of Multinational Corporations, COLEF-CONACYT Project #55108, “Firmas Multinacionales en México: un estudio sobre la estructura organizacional, la innovación y las prácticas de empleo” (Multinational Firms in Mexico: A Study of the Organizational Structure, Innovation, and Employment Practices), 2008-2009.

Following similar analysis patterns, the main ideas can be listed as follows:

1. The most obvious idea is given by the intercept. The low value of the regression coefficient (0.02) and the Wald test statistic (0.03), together with a p-value (0.87) much higher than 0.05, are indicating that, most generally, the two sectors are very similar in terms of the variables examined, although not completely homogeneous. There are differences, obviously, as will be seen immediately, but they would not be extreme.
2. Of the independent variables, not all were statistically significant in this model. The p-value of the “degree of integration into the chain” variable is 0.23 (see column titled Sig), a value above 0.5, which rejects the hypothesis that they are statistically and importantly interlinked, so it will no longer be considered in the following points. The other two independent variables, “degree of internationalization” and “innovative capacity,” were significant.
3. The relationship that these two significant variables have with the comparison value, that is, manufacturing, is straightforward, since all coefficients are positive (column titled “B”). This means that, if internationalization and innovative capacity were to grow, it is more likely that, in a general sense, it is a manufacturing company rather than a services one.
4. The strength of this probability is unequal, being much more intense in the “degree of internationalization” variable than in the “innovative capacity” one. If the first is increased, it is 10.48 times more likely that the change occurs in a manufacturing company. If the considered growth refers to the second variable, then the probability that it is a manufacturing company is only 1.65 times more relative to it being a services one.

Summarizing these three points, it can be said that the levels of integration into value chains are similar in both types of enterprises, and they are not a reliable parameter to tell them apart. While the innovative capacity is a more common feature among manufacturing enterprises, it is not much more than in the services ones. Another situation is what happens with internationalization. In Mexico, manufacturing companies are much more internationalized than those of services. The global trend noted previously does not yet seem to have reached transnational service companies operating in Mexico. In general, when considering these three variables, there does not seem to be major differences between the two sectors, except the degree of internationalization.

Table 4 shows the intersection of the two dependent variables of the two logistic regression models presented: employment status and sector.

Table 4. Labor and Employment Status in MNEs, by Main Activity Sector.

Employment Status	Sector	
	Manufacturing	Services
Inferior labor environment	63.5%	52.9%
Superior labor environment	36.5%	47.1%
Total	100%	100%

Source: Survey of Multinational Corporations, COLEF-CONACYT Project #55108, “Firmas Multinacionales en México: un estudio sobre la estructura organizacional, la innovación y las prácticas de empleo” (Multinational Firms in Mexico: A Study of the Organizational Structure, Innovation, and Employment Practices), 2008-2009.

As expected, although it is most common to find below average employment statuses in both types of enterprises, nonetheless, services enterprises show a slightly higher profile than manufacturing ones regarding job characteristics that have been considered in this work.

Conclusion

Considering the results of the analyses conducted based on the survey data, some ideas can be derived, more like preliminary inferences, logically subject to further intense studies, than as final conclusions.

1. While the magnitude and quality of employment enjoy a slightly higher situation in the most innovative and integrated companies, the reality is that neither the strength of the innovative capacity nor the degree of consistency of the integration of companies into their respective chains seem to have a *transcendent* effect on the considered dimensions of employment.
2. This is not the case, however, of the degree of internationalization. This was a particularly influential element, although with an impact that could be considered negative. The job performance tended to be lower among MNEs with higher levels of internationalization.
3. It was also this same factor the only truly discriminant one of the sector. In terms of innovative capacity and degree of integration, manufacturing and services do not differ categorically. But they do depending on the degree of internationalization, manufacturing MNEs leading in this dimension over services MNEs. The degree of internationalization would thus be—considering the issues in the previous point—the key factor to explain why employment status is slightly higher in services MNEs than in manufacturing MNEs. The word “slightly” should be emphasized because actually no substantive differences are noted between the sectors regarding the magnitude and quality of employment.

Some of these ideas do not work in favor of the existing general representations regarding the relationships among these variables. When it comes to establishing differences relative to job characteristics, it does not seem to matter much if the company is more or less innovative, let alone how much it is integrated into global value chains. Nor does it seem to matter much if the MNE conducts its economic activity in manufacturing or services. What is most common is that the employment status is below average in all these cases. Other ideas are even carried out in reverse. Not only do the findings not show any support for the notion that the export capacity—and, in general, the degree of internationalization—favors employment conditions, but the results contradict this principle.

Are the MNEs located in Mexico so different in these aspects from those operating in other countries? By contrasting the results presented with the existing literature, it could be intuited that, precisely, that is the reality, at least to some extent, which would eventually allow the pursuit of a line of research in this direction. But that assessment is only, of course, at the level of conjecture. No statement in this regard could be conclusive since, as was already stated, none of these results is definitive. Issues relating to the data and the analyses themselves could be contributing to limiting the range of the conclusions. Nonetheless, the results are sufficiently suggestive as to stimulate debate on the subject and encourage more in-depth research on these same issues in future studies.

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Le rôle de la veille stratégique dans l'agilité du processus d'innovation. Application au champ non médical en milieu hospitalier, le cas "Assiette Durable"

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Si le processus de l'innovation de service a fait l'objet de travaux importants au cours des 20 dernières années, le lien entre veille concurrentielle et stratégique avec la construction de l'innovation a été moins analysé. Cette communication, se propose de confronter un modèle représentatif de ce lien avec une étude de cas réalisée dans le secteur hospitalier sur une innovation non médicale. Celle-ci confirme l'existence d'un lien fort entre veille et innovation, avant et pendant le processus de construction de l'innovation, pour une grande variété d'acteurs impliqués dans le processus, quel que soit leur niveau de responsabilité.

If researchers have investigated the service innovation process for the last twenty years, one cannot say the same about the link between strategic and competitive watch, and the innovation process. We will focus our attention on this link. In this paper, we will analyse a case study (non medical innovation in the hospital sector) through our model. It confirms how many people with various responsibilities are involved in the innovation process, and search for information, data and knowledge to participate.

1 Introduction

Le développement de la réflexion sur le management des activités de service s'est accompagné en parallèle d'une interrogation sur la nature et les modalités de l'innovation dans ces activités. Le modèle de Booz, Allen & Hamilton, construit pour analyser l'innovation dans les activités manufacturières a servi de base de réflexion pour la conception de plusieurs modèles destinés aux services : Shostack (1984) ; Donnelly, Berry & Thompson (1985) ; Bowers (1985, 1987 & 1989) ; Scheuing, Johnson & Gaida (1986) ; Anderson & Pennington (1992) ; Palmer & Cole (1995) ; Edvardson & Olsson (1996), Lovelock & Lapert (1999) Toutefois ces modèles apparaissent fragiles dans leur phase amont, c'est à dire la génération des idées et leur sélection, (Jallat, 2000). Des blocages apparaissent également dans la réalisation du processus d'innovation et semblent avoir plusieurs causes qui affectent là encore l'amont de la procédure, telles les différences d'appréciation entre les individus ou sous-groupes de l'entreprise par rapport à la validité du projet en cours, les hypothèses émises, les méthodes employées, les critères utilisés pour la validation de l'innovation (De Coninck, 1998). Toutefois, c'est davantage l'analyse de la partie aval de la mise en œuvre du processus d'innovation qui va intéresser les chercheurs, d'autant que le développement des TIC ouvre des opportunités à la transformation des processus de production des services qui affecte souvent la partie « visible » du modèle de servuction (Eiglier & Langeard, 1987).

L'émergence de l'idée dans l'étude du processus d'innovation de service nous a semblé mériter des analyses complémentaires. En effet, les travaux de Lesca et son équipe (2006) ont mis en évidence les effets positifs de la veille anticipative sur l'identification des phénomènes intéressants, comme celle de phénomènes potentiellement dangereux en termes de développement de nouveaux produits ou services. La veille qui consiste à identifier des discontinuités ou des ruptures et qui pourraient être sources de menaces ou d'opportunités (exploration de l'environnement) peut par exemple alimenter très en amont des démarches d'anticipation, d'innovation et de créativité. De même les travaux de Simon mettent en exergue, dès 1960, les effets de la veille sur le processus de décision stratégique via la phase d'intelligence de l'environnement.

Dans cette communication qui reprend une partie des travaux de thèse de S.A Gozim, nous avons centré notre réflexion sur les innovations non médicales dans le secteur hospitalier. Ce secteur d'activité a en effet été très précisément investigué (Djellal et Gallouj, 2004, 2007) parce que les innovations de processus qu'il suscite combine une réflexion technologique plus ou moins visible par le destinataire du service et un nouveau concept auquel le destinataire peut être sensible. Il présente enfin des caractères similaires à ceux que l'on peut trouver, de façon plus parcellaire, dans des secteurs aussi différents que l'assurance, l'hôtellerie, la restauration....

Dès lors notre question de recherche portera sur la complémentarité entre veille stratégique et processus d'innovation et sera centrée sur la définition des fonctions essentielles d'un dispositif de veille stratégique, pouvant s'articuler dans un tout cohérent et complémentaire à un processus d'innovation applicable aux services.

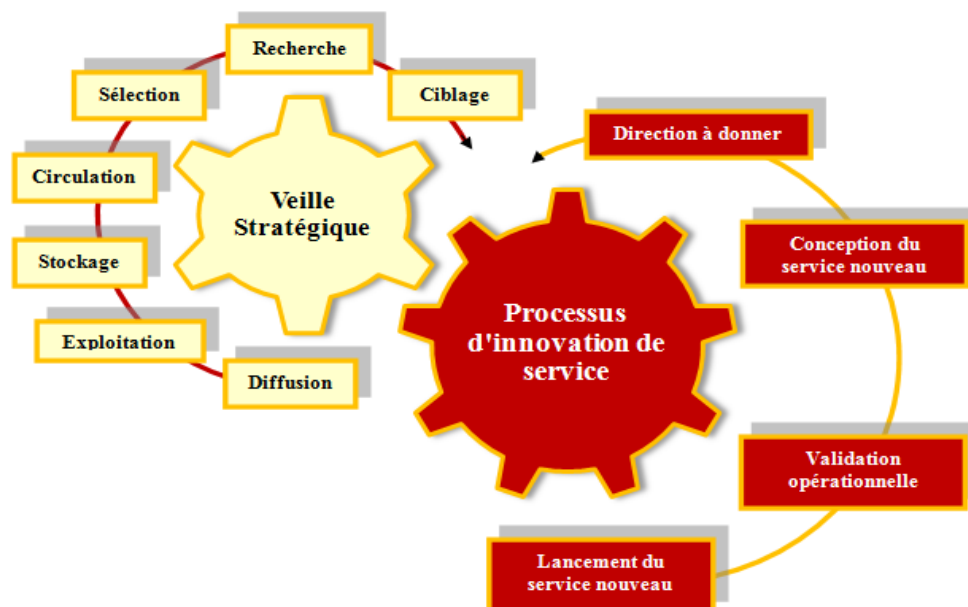


Figure 1. Graphe 1. Les rouages de la complémentarité de la veille stratégique au processus d'innovation.

Etabli par SA Gozim à partir des travaux de Lesca

Dans une première partie, nous nous appuyerons sur les travaux relatifs à l'innovation de services et à la veille stratégique pour construire un modèle mettant en relation veille et process d'innovation. Dans une seconde partie nous confronterons ce modèle à une étude de cas réalisée dans le champ des services hospitaliers non médicaux.

2 De la veille à l'innovation de services

2.1 Le processus d'innovation dans les services: modèles par étape

Un certain nombre d'auteurs spécialisés dans le champ du management des services (Jougoux, 1993 ; Everaere, 1997a ; Durieux, 2000a ; Flipo, 2001 et Abramovici & Bancel-Charensol, 2002, etc.), et plus particulièrement celui du marketing des services (Shostack, 1984 ; Eiglier & Langeard, 1987 ; Scheuing & Johnson, 1989 ; Jallat, 1992 & 1994 et Lovelock & Lapert, 1999, etc.) ont consacré des investigations aux aspects spécifiques de l'innovation. La plupart ont insisté sur le fait que les processus connus pour les biens matériels nouveaux devaient être revus pour tenir compte des caractéristiques des services et de l'organisation des entreprises du tertiaire. Aussi, l'immatérialité des services doit être en quelque sorte surcompensée par la rationalité et le formalisme de l'approche. La méthode proposée consiste en l'identification d'un certain nombre d'étapes variables selon les auteurs.

Pour illustrer ce courant de recherche, nous avons choisi le modèle de Scheuing & Johnson (1989) dont la complétude n'est pas synonyme de complexité dans l'application.

Ce processus comprend quinze (15) étapes détaillées, que l'on peut aussi regrouper en quatre (4) grandes phases, reproduites dans le tableau ci-dessous :

Table 1. Modèle normatif de processus de développement d'un service nouveau (adapté de Scheuing & Johnson, 1989, vol.3, n°2, pp. 25-35).

Phases	Etapes détaillées
La direction à donner I	1. Objectifs et stratégie, cadre de la formulation du nouveau service. 2. Génération d'idées. 3. Tri des idées.
La conception du service nouveau II	4. développement du concept. 5. test de concept. 6. Analyse du potentiel des ventes. 7. Autorisation du projet de lancement.
La validation opérationnelle III	8. Conception de la servuction et test. 9. Mise en œuvre de la servuction et test. 10. Conception du plan marketing. 11. Formation du personnel.

Phases	Etapes détaillées
Le lancement du service nouveau.	12. Test du service et première expérimentation.
IV	13. Test marketing.
	14. Lancement en vraie grandeur.
	15. Evaluation post-lancement.

La réalisation des deux premières phases du processus décrit, que nous avons qualifiées de „direction à donner“ et „conception d'un nouveau service“ font l'objet de remarques dans la pratique (Jallat 1992 & 2000) :

- Peu de procédures systématiques de génération d'idées sont mises en place.
- Le processus d'innovation est souvent initié par des facteurs internes.
- Le personnel au contact est le principal percepteur des faiblesses du processus productif existant
- L'impact potentiellement défavorable du lancement d'un nouveau service sur les services existants est largement relayé par les salariés de l'entreprise.

En l'absence d'une concurrence pressante, le processus d'innovation trouve essentiellement sa dynamique créative dans celle des salariés de l'entreprise, en fonction de la liberté d'expression accordée. Si la pratique de la servuction conduit à se focaliser sur la relation et les échanges informationnels entre le personnel en contact et le client (Djellal F. & Gallouj F, 1999), limiter la collecte d'informations et le regard sur la pertinence du service actuel n'apparaît donc pas sans danger, en particulier dans des structures très hiérarchisées.

Mais l'analyse du processus de la prestation de services hospitaliers et des innovations correspondantes réalisée par l'équipe de l'université de Lille permet d'enrichir notre réflexion, dans ce contexte particulier. En effet, l'impact de la prégnance des tutelles sur les organisations prestataires ne peut être sous-estimée quant à ses effets sur la dynamique d'innovation née des interactions entre agents prestataires et client usager.

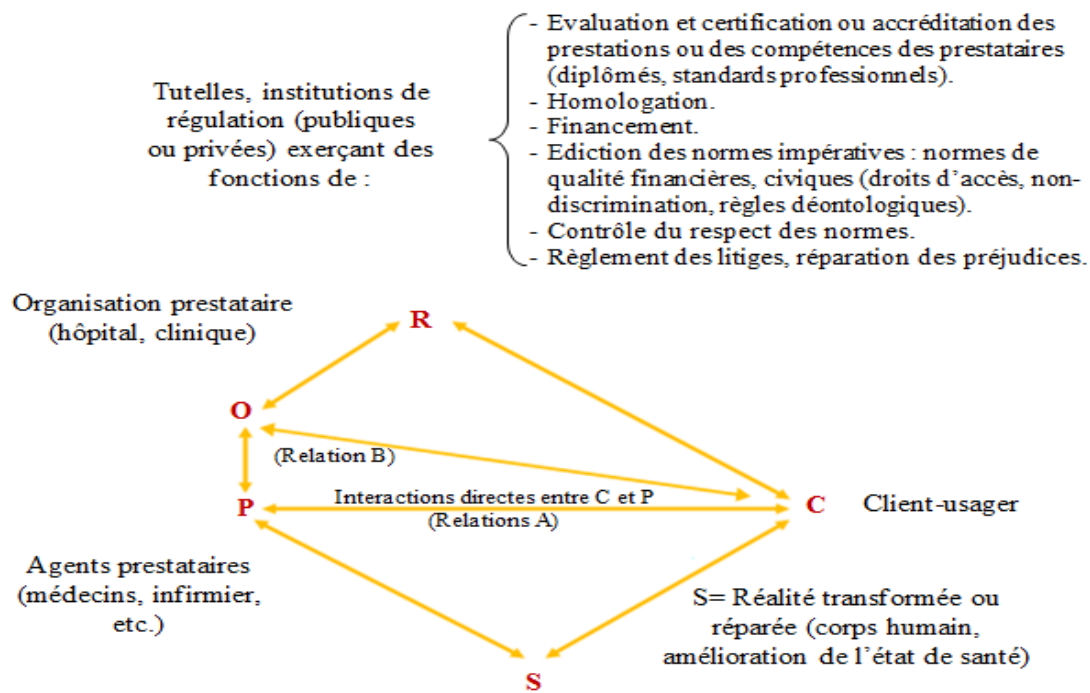


Figure 2. Pentagone des services hospitaliers
Source : Djellal F., Gallouj C. & Gallouj F., (2002).

Les travaux de l'équipe concernée nous permettent aussi d'affiner l'analyse des relations entre les acteurs de l'innovation dans ce secteur.

2.2 Les relations entre acteurs au sein du processus d'innovation dans les services hospitaliers

S'appuyant sur la représentation lancastérienne élargie du produit ou du service F.Gallouj (2002) et Gallouj et al,(2004) rendent compte des nombreuses caractéristiques du service obtenues (Y), par la mobilisation de compétences (C), de matériel, (M), de méthodologies (K), de relations (R).

Table 3. Décomposition fonctionnelle du produit ou de la prestation hospitalière.

Prestations de services élémentaires	Compétences	Support du service, opérations ou fonctions correspondantes et technologies associées				Caractéristiques ou fonctions (« externes ») d'usage finales ou de services
Si	C	M	I	K	R	Y
	Compétences sur les technologies (leur usage) ou compétences mobilisées directement	Opérations « matérielles » (+ sciences et technologies correspondantes)	Opérations « informationnelles » (+ sciences et technologies correspondantes)	Opérations « méthodologiques » (+ sciences et technologies correspondantes)	Opérations de service en contact relationnelles (+ sciences et technologies correspondantes)	Fonctions et caractéristiques de services (+ disciplines correspondantes)
Médecine, soins						
Hôtellerie						
Maintenance						
Accueil, réception						
Transport						
Gestion, administration						
Restauration						
Crèche						
Buanderie						
Loisir						
Commerce						
Funéraire						
Nettoyage, traitement des déchets						
Etc.						

Source : DJELLAL F., GALLOUJ C., GALLOUJ F. & GALLOUJ K., (2004), L'hôpital innovateur : de l'innovation médicale à l'innovation de service, Masson, Paris, p. 77.

Chaque case du tableau ci-dessus peut constituer un gisement d'innovation à l'hôpital. D'autre part, certaines cases peuvent être ajoutées et d'autres supprimées, permettant ainsi d'accroître ou de réduire le périmètre du « produit hospitalier » et le champ de prospection de l'innovation. De la sorte, cette grille peut être utilisée à la fois comme instrument d'audit de l'existant et de prospective, puisqu'il devient possible de mettre en évidence un certain nombre d'axes ou de logiques d'innovation hospitalière.

2.3 De la veille au processus d'innovation dans les services hospitaliers

A partir des années 60 le rôle d'une surveillance de l'environnement de l'entreprise sur la qualité de la prise de décision comme sur la dynamique de l'innovation est souligné par des chercheurs comme Simon (déjà cité), Aguilar (1967) et Lesca (1986). Qu'elle soit passive ou active. (Martinet & Ribault, 1989) la veille permet d'explorer l'environnement et de décoder les signaux dont il est porteur. Elle soutient alors l'activité, le métier et les processus clés de l'organisation, la prise de décision des managers et la réalisation d'une stratégie délibérée ou émergente. Son but ultime est de construire un avantage concurrentiel, de contribuer à la création de valeur ou de se protéger contre d'éventuelles menaces, et finalement de pérenniser une activité ou une organisation.

Le choix du secteur d'activité (services hospitaliers) nous conduit à proposer un modèle qui s'appuie à la fois sur les travaux et le modèle de Lesca (exploration de l'environnement et étapes du processus de veille), les travaux de Simon (intelligence de l'environnement) et l'analyse du processus d'innovation de l'équipe Gallouj présenté précédemment (facteurs impliqués et structuration du processus).

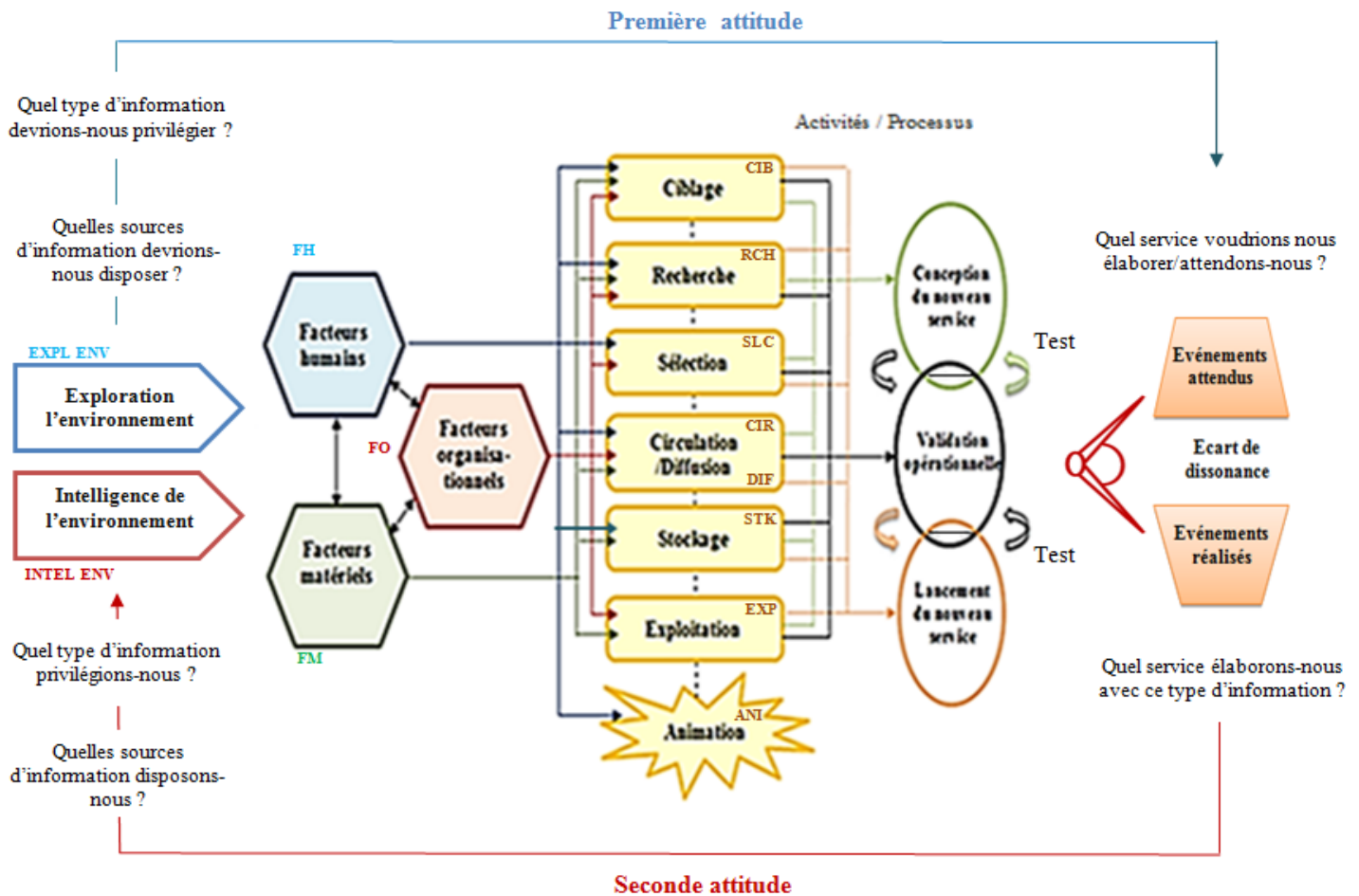


Figure 3. Modèle d'intégration de la veille dans le processus d'innovation de services.
Source Thèse de Sid Ahmed Gozim à paraître.

Nous confronterons dans la seconde partie de cette communication ce modèle à une étude de cas réalisée dans une structure hospitalière.

3 Le modèle au crible du cas « assiette durable »

3.1 Le choix méthodologique

Le choix d'une méthode qualitative s'appuyant sur l'analyse de plusieurs cas nous a paru justifié par Charreire et Durieux (1999) qui rappellent l'intérêt de cette méthode lorsque l'objectif de la recherche est « de créer de nouvelles articulations théoriques entre des concepts et d'intégrer de nouveaux concepts dans un champs théorique donné ». Ici l'objectif est de comprendre et d'analyser le processus d'innovation quant à son déclenchement et son développement en fonction d'une éventuelle attitude à prêter attention à l'environnement, cette attitude étant considérée elle-même comme un processus organisationnel.

Bien que la méthode des cas ait été longtemps critiquée pour son manque de rigueur, sa faible capacité de généralisation scientifique, elle se révèle très adaptée et justifiée pour l'exploration des caractéristiques complexes des phénomènes sociaux, lorsque les théories actuelles n'offrent qu'une vision partielle, ou pour générer de nouvelles conceptions théoriques (Eisenhardt, 1989 ; Yin, 1994 ; David, 2004).

Pour représenter les articulations entre la veille stratégique et l'innovation en milieu hospitalier, il était nécessaire d'observer plusieurs contextes, compte tenu de la richesse des activités périphériques. L'étude de cas multiples a semblé plus appropriée. Dans le cadre de cette communication, une seule, pourtant, sera présentée, choisie au sein des 4 qui sont analysées dans le cadre du travail doctoral et ont permis d'étudier des logiques de métiers, des domaines de compétence hétérogènes des processus d'innovation permettant d'envisager l'identification de régularités et différences dans les pratiques. L'ensemble du travail doctoral ayant mis en évidence les contraintes fortes des structures publiques (sur lesquelles nous reviendrons ultérieurement, quant à la démarche d'innovation, nous avons choisi ici de présenter une des études de cas effectuées dans une clinique privée (SA) de la région toulousaine (France). Le point d'observation de cette étude est la direction technique, informatique et logistique, meneur du processus d'innovation étudié. Une analyse de contenu a été effectuée à partir des entretiens semi directifs réalisés auprès de 13 personnes, en

utilisant le logiciel Modalisa qui permet de « faire émerger des codes dits principaux dénommés nœuds puis d'organiser les données sous forme d'arbre hiérarchique ou de réseau conceptuel » (Bournois et al., 2002, p 77)

3.2 Le cas assiette durable

L'arrivée de la nouvelle direction de la clinique marque l'engagement dans une démarche active en termes de développement durable, qu'elle veut construire autour de 3 piliers : qualité de l'environnement, efficacité économique, équité sociale. « La restauration fait partie des soins » sera une phrase que nous entendrons tout au long des entretiens, et positionne ainsi les objectifs de l'innovation étudiée dans la stratégie de l'entreprise. L'environnement économique se caractérise au moment du lancement de la réflexion par une baisse de l'activité des médecins, une concurrence accrue d'autres établissements de santé, et la baisse du niveau de prise en charge des soins par la sécurité sociale française. Par ailleurs, l'ensemble des enquêtes de sortie des patients met en évidence l'importance accordée aux activités connexes au médical et plus particulièrement l'hôtellerie et la restauration.

3.2.1 La direction à donner

Pour la diabétologue que nous avons interrogée, membre du conseil d'administration de la clinique P, présidente du CLAN (comité de liaison de l'alimentation et de la nutrition) et de l'association « *Diabète Ensemble* », tout a commencé par un ouvrage qui a pour titre : « *Tous gros demain ? : 40 ans de mensonges, 10 kilos de surpoids* » du chercheur et agronome Pierre Weill¹⁵⁰. Celle-ci a tenu à faire partager la vision de l'auteur à ses plus proches collaborateurs, ainsi qu'à sa hiérarchie, en prêtant l'ouvrage au président directeur général de la clinique, au directeur de l'établissement ainsi qu'au directeur technique, informatique et logistique, sans oublier les diététiciennes dont elle en a la charge. L'auteur a été invité à animer une conférence, basée sur son nouvel ouvrage intitulé : « *Mon assiette, ma santé, ma planète* », qui à l'époque n'était pas encore commercialisé. Les idées de l'auteur, qualifiées de révolutionnaires, suscitent une réflexion approfondie, une participation au salon Dietecom¹⁵¹, des contacts avec les responsables de SIIN (Scientific Institute for intelligent Nutrition) ainsi qu'avec l'association et le label Bleu-Blanc-Cœur¹⁵².

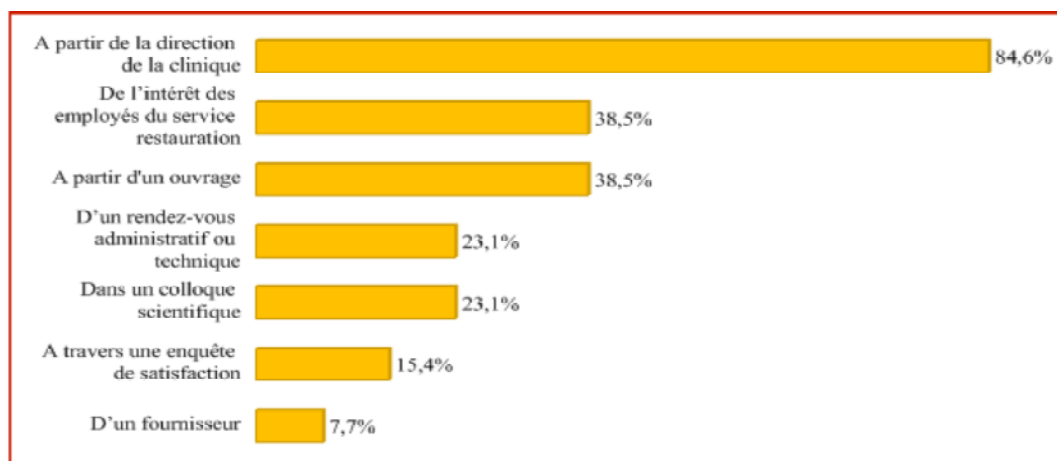


Figure 4. Emergence de l'idée de la refonte des menus.

Interrogés : 13 / Répondants : 13., Pourcentages calculés sur la base des répondants

Source : Etabli par l'auteur

L'approche choisie requiert une prise en compte de la préparation du repas dans son ensemble. Une analyse complète du processus de restauration est dès lors été effectuée afin d'en faire un véritable axe de différenciation pour la clinique. Dès lors, les composantes suivantes du processus sont analysées : approvisionnements et logistique, transformation et le contenu de la prestation, service au client. La rénovation antérieure (5 ans plus tôt des installations de cuisine) et la décision prise à l'époque de maintenir *in situ* la fabrication des repas, facilitent la mise en place du processus d'innovation.

¹⁵⁰ Weill P. travaille depuis quinze (15) ans sur le lien entre modes de production agricole et santé. Il a signé de nombreux articles scientifiques sur le sujet.

¹⁵¹ Le 1^{er} salon de la nutrition destiné aux professionnels de la santé.

¹⁵² Label du ministère de la santé français relatif à la qualité nutritionnelle.

3.2.2 La conception du nouveau service

Une « *commission menu* », est créée, dont le but est le recueil des besoins informationnels de l'ensemble des professionnels de la clinique considérés comme impactés par cette innovation. Elle comprend un membre du CLAN¹⁵³, des médecins de différentes spécialités, des chefs cuisiniers et une personne chargée des menus, des diététiciennes, des aides soignants, une gouvernante, un membre du service qualité, un informaticien. Ce groupe de travail pluridisciplinaire rédige un cahier des charges, définissant les règles à utiliser pour constituer une nouvelle carte.

La gestion d'une carte sous entend la gestion des cycles (nombre, saisonnalité, durée), les caractères des menus déjeuner et dîner (composantes du menu normal, définition des déclinaisons et / ou des régimes), la définition des petits déjeuners et collations (composantes de base, définition des déclinaisons et / ou des régimes). Elle doit aussi intégrer les cartes de remplacement, la gestion de la présentation et le traitement des odeurs, dans le respect de l'équilibre économique.

Parallèlement à cette commission, les diététiciennes ont en charge la confection d'un plan alimentaire, et les chefs ont la responsabilité d'élaborer une liste des produits disponibles et de leurs coûts. Les conclusions sont transmises à la commission pour que, le cas échéant, elle puisse émettre des avis.

Un second groupe de travail restreint est alors constitué, faisant étroitement collaborer les chefs cuisiniers avec les diététiciennes pour construire les menus, les agréments, les écrire dissolvant ainsi le manque habituel de communication et les cloisonnements latéraux habituels des deux (2) services.

La validation des menus par la commission clôt le processus. Chaque membre de la commission doit valider le fait que les nouveaux menus soient conformes aux exigences de son activité et de ses responsabilités (diètes, équilibre des repas, satisfaction des patients, coûts...). Le service auprès du patient doit être optimisé, ainsi que le processus de fonctionnement de la chaîne « *approvisionnement - commande - préparation - livraison* ».

Les nombreuses déclinaisons du menu normal liées aux besoins spécifiques des patients supposaient l'intégration de ceux-ci sur des tablettes utilisables par les hôtelières et l'adjonction d'une documentation permettant à ces personnes de répondre en cas d'interrogation du patient.

Au cours de ce processus de conception, la clinique signe un partenariat avec un maraîcher local, l'ESAT (établissement de service et d'aide par le travail), grâce à l'un des responsables de la cuisine qui connaissait personnellement cette structure, en a référé à sa hiérarchie qui a estimé que la qualité des produits frais se ferait sentir sur le plan gustatif et aurait un impact positif sur la santé du patient. La commission s'est fait accompagner par le C2DS pour vérifier que la dimension durable était bien prise en considération tout au long du processus (achats, consommation d'énergie, d'eau, traitement des déchets...).

La durée de cette phase a paru longue aux membres de l'équipe projet qui ont considéré ne pas avoir suffisamment de temps, du fait de leurs autres activités, pour effectuer les recherches nécessaires, contacter les patients et intégrer les observations et critiques émises par les membres de la commission. Par ailleurs, les différences de sensibilité entre diététiciens et chefs cuisiniers (équilibre alimentaire versus processus de fabrication), ou entre l'hôtelière intégrée à la commission et les patients ont rendu les échanges difficiles, en particulier avec l'avancée du projet et la fatigue correspondante.

¹⁵³ Le CLAN est un organe technique, collégial, spécifique créé pour une durée indéterminée. Il participe à la définition et à la mise en œuvre de la démarche d'amélioration de la qualité de l'ensemble de la prestation alimentation - nutrition au sein de la clinique.

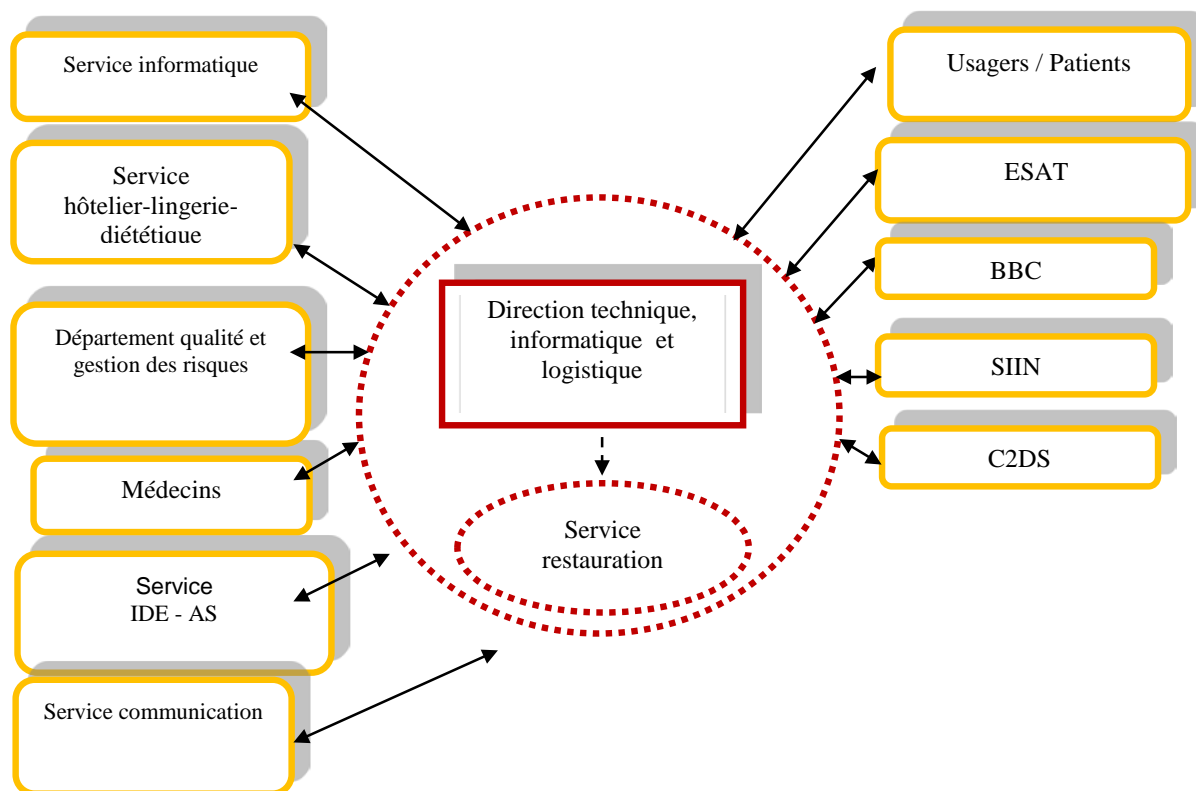


Figure 5. Les acteurs impliqués - Cas « Assiette durable ».

3.2.3 Lancement du nouveau service

La mise en place du nouveau service a conduit à réviser à plusieurs reprises les caractéristiques des repas qui étaient proposés tant aux patients qu'au self service de la clinique. Si un plat ne passait pas ou était jugé trop lourd, l'hôtière transmettait l'information aux diététiciennes et au chef de projet. Le chef cuisinier s'est rendu souvent auprès des patients pour recueillir une information qu'il trouvait trop parcellaire.

Une fois la proposition des menus été /hiver réalisée, une prolongation du projet a abouti à celle des menus automne/printemps dans le même souci du respect de l'ensemble des contraintes « développement durable ».

Pour diffuser l'information et motiver l'ensemble du personnel et particulièrement ceux qui n'étaient pas représentés dans la commission projet, le service communication (facturation, pharmacie...). Une chaîne télévision restauration a été ajoutée à la chaîne institutionnelle avec l'annonce du menu du jour, de ses déclinaisons et caractéristiques, des articles dans le journal de la clinique ont été publiés avec diffusion d'interviews des patients.... Des soirées ont été organisées avec le personnel médical pour expliquer les choix. Pourtant la communication est jugée insuffisante par un grand nombre de répondants.

3.3 Le modèle et la pratique

3.3.1 Les différentes formes de l'innovation étudiée

La perception de l'innovation par les patients et le personnel de la clinique est rendue visible par l'évolution des menus (saisonnalité, régionalisation, diversité). En affirmant „la restauration fait partie des soins“, la direction de la clinique choisissait de modifier le positionnement de la restauration vis à vis tant du personnel médical que des patients. L'intégration de choix de plats et d'un renouvellement de la vaisselle utilisée apportait aussi une dimension « plaisir » susceptible d'exercer une influence sur la psychologie du patient. Enfin, en élargissant l'utilisation des menus à la restauration du personnel, la direction affichait l'intégration d'une dimension développement durable dans le quotidien des acteurs de la clinique. Nous pouvons donc parler d'une innovation de service.

Derrière cette innovation transparaissent aussi des innovations organisationnelles. La diète des malades n'est plus considérée comme une contrainte qui affecte l'organisation des repas, mais comme une information qui enrichit le processus de construction du service de restauration.

- Le diététicien n'intervient plus en aval du chef cuisinier mais en partenariat avec lui. Le responsable des achats est intégré à ce binôme car susceptible de proposer des produits ou des producteurs compétitifs dans l'instant ou dans le temps.

- Le choix de l'utilisation plus importante de produits frais supposait une modification importante de la logistique nécessaire au traitement des matières premières consommables (contrôle à réception, stockage, refroidissement).
- les fonctions de l'hôtière ne se limitent plus à la vérification de l'adéquation repas-destinataire, elle doit proposer, en fonction de la diète du patient, les plats proposés avant leur réalisation. Si le contact fait partie de l'évolution visible du service, la collecte de l'information et son transfert vers la cuisine constitue une innovation organisationnelle, d'autant qu'elle se traduit par une transmission sous forme numérique.

Les innovations organisationnelles dans leur dimension technologique, humaine et partenariale s'ajoutent donc à l'innovation servicielle apparente.

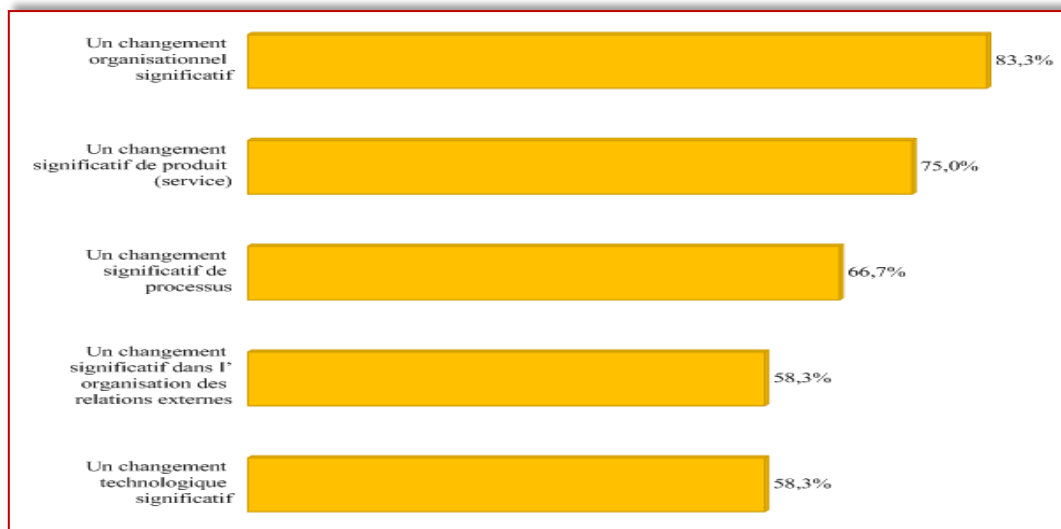


Figure 6. Changements produits ou éléments de nouveauté significatifs engendrés par la refonte des menus.

Source : enquête SA Gozîm.

3.3.2 Les différentes compétences et supports utilisés

La grille d'analyse de l'innovation de service proposée par l'équipe de Lille (Djellal et al., 2004) permet de mettre en valeur les différentes fonctions utilisées et la variété des compétences nécessaires pour réaliser l'innovation étudiée.

Table 3. Le projet « Assiette Durable » dans la grille d'analyse de l'innovation.

Prestations de services élémentaires	Compétences	Support du service, opérations ou fonctions correspondantes et technologies associées				Caractéristiques ou fonctions (« externes ») d'usage finales ou de services
Si	C	M	I	K	R	Y
	Compétences sur les technologies (leur usage) ou compétences mobilisées directement	Opérations « matérielles » (+ sciences et technologies correspondantes)	Opérations « informationnelles » (+ sciences et technologies correspondantes)	Opérations « méthodologiques » (+ sciences et technologies correspondantes)	Opérations de service en contact relationnelles (+ sciences et technologies correspondantes)	Fonctions et caractéristiques de services (+ disciplines correspondantes)
Médecine, soins						
Hôtellerie- Lingerie- Diététique.						
Maintenance						
Accueil, réception						
Transport						
Gestion, administration						
Restauration						
Crèche						
Buanderie						
Loisir						
Commerce						
Funéraire						
Nettoyage, traitement des déchets						
Etc.						

Le concept d'élargissement vertical et horizontal des acteurs du projet (tels que définis par l'équipe de Lille) appliqué à l'innovation étudiée met l'accent sur leurs besoins informationnels.

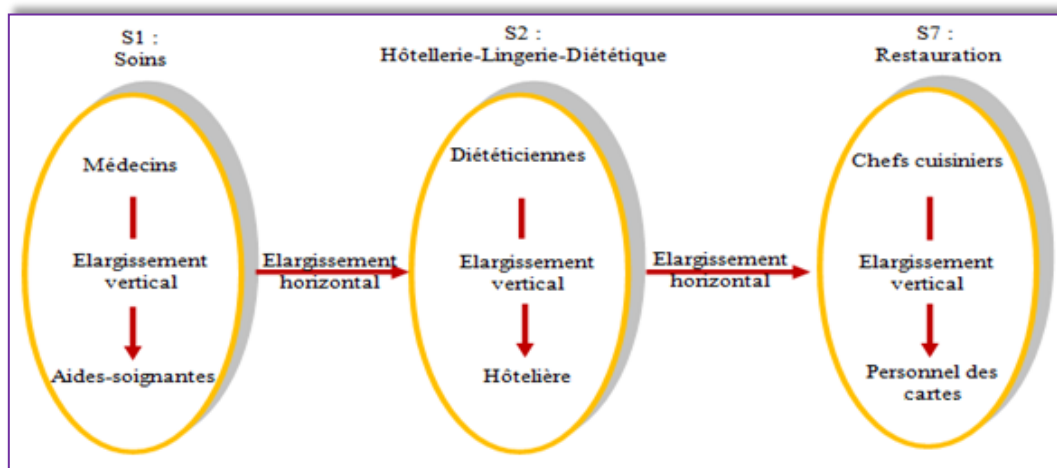


Figure 7. Elargissement vertical et horizontal des acteurs du projet « Assiette Durable ».

3.3.3 Les sources et formes de veille.

L'orientation de la direction de la clinique vers une politique de développement durable, s'est appuyée, sur une exploration de l'environnement concurrentiel et une évolution des attentes de la clientèle. Exploration dont le caractère actif n'est pas certain, puisque la sensibilité aux problèmes environnementaux en général est largement présente dans les medias. Pourtant elle apparaît suffisamment partagée par l'équipe de direction pour qu'elle soit réceptive à la proposition de réflexion lancée par la diabétologue, membre du conseil d'administration.

La politique de veille menée alors par la diabétologue prend un caractère très actif et même proactif par ses actions de « lobbying », auprès des autres membres du conseil d'administration, et de nombreux médecins et diététiciens.

Pour que l'idée de révision des formes de la restauration prenne corps, il apparaît nécessaire à la diabétologue et sans doute à la direction de s'appuyer sur un médiateur, l'auteur des ouvrages sur la nutrition, pour que les acteurs de la clinique, puissent envisager leur rôle dans un projet innovant. Il s'agit en effet de nourrir leur propre discipline et responsabilité de cette réflexion sur la nutrition. Nous pouvons évoquer une intelligence de l'environnement qui vient compléter la démarche d'exploration de l'environnement.

A partir de la mise en place du processus de construction de l'innovation (commission pluridisciplinaire et commission des menus), le processus de veille est porté par de nombreux membres de ces commissions (veille concurrentielle, veille logistique, para médicale...), voir leurs adjoint ou collègues travaillant dans leur service. Nombreux seront les acteurs qui se plaindront de ne pouvoir mener cette veille avec le sérieux nécessaire. Des retours permanents seront effectués devant les commissions ad hoc qui conduiront à un élargissement du projet initial. Ils permettront aux animateurs des commissions et au responsable du projet de valider son opérationnalité et de le lancer.

4 Conclusion

En proposant de passer une étude de cas au crible d'un modèle d'analyse du rôle de la veille sur le processus d'innovation d'un service, nous prenons évidemment un risque, puisque celle-ci ne peut être jugée représentative de toutes les situations d'innovation, même si nous nous limitons aux services non médicaux dans le domaine hospitalier. Toutefois, celle-ci et les autres menées dans le cadre d'un travail doctoral, fait apparaître les modalités de l'émergence d'une idée, dans une structure de production complexe, et les apports des différentes formes de veille pour chaque acteur qu'il se sente concerné et impliqué dans le projet ou qu'on lui demande de s'impliquer.

Si le dynamisme de la structure, du conseil d'administration aux équipes productives transparaît dans ce cas, les freins et les réticences ne manquent pas dans cette structure privée, en particulier après la première phase d'enthousiasme.

Les autres études de cas réalisées dans le travail doctoral ont permis de faire apparaître l'influence de la structure juridique sur le processus d'innovation et la mise en place de la veille. Elles seront présentées dans le travail final.

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Non-profit service providers and social innovation for liveable and fair cities. Empirical evidence from Italian case studies

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Recent European social policies have highlighted the importance of social innovation as a tool to improve urban livability, in particular during the last decades of economic crisis, collapsing Welfare State and emergence of new social demands. While the Keynesian urban planning has shown great limits of economic sustainability, neoliberalism has introduced new risks of splintering urbanism: emergence of premium networked spaces, commodification of public services and financialization of local infrastructure (Graham; Marvin, 2001). Local community interests on social, cultural and environmental issues are often overwhelmed by economic development per se (Perkins, 2010). On the contrary, an increasing emphasis has been spread on community and its initiatives both in the governance of urban public spaces and in the delivery of public services (Swyngedouw, 2005). Civil society initiatives, actually, show a relevant capacity of social innovation linked to a deeper knowledge of community needs, enhancing transparency and information flows, stimulation of original solutions and, finally, a stronger motivation in (voluntary) workers (Bovaird, 2007). A set of Italian case studies of civil society activities have been chosen from the main sectors which mostly affect the livability of a city: health, education, housing, local mobility, environment, sport and cultural facilities. Founders and managers have been interviewed and reports, where available, have been collected and analyzed. The analysis aims at identifying the attitude of these organizations to social innovation, the origin and the main characteristics of this attitude and, finally, the impact on urban livability.

1 Background

“Can neighbourhoods save the city?”: this is the question Moulaert et al. (2010) moved from studying third sector initiatives and urban livability. In fact, beyond the dichotomy public-private for profit, studies on civil society initiatives have more and more underlined the importance of third sector in order to face the challenges of unlivability in cities based on both social exclusion and urban individualization.

Because of their great opportunities, cities have been experiencing since last century a huge enlargement of their dimension and an increase of population; by 2030, 60% of world population will live in cities (McKinsey, 2013). A similar trend can be seen in Italian cities, where, during the last 15 years, the percentage of people living there is more than 30%, in particular around the “metropolitan regions” of Milan, Rome, Naples and Turin. While the growth of cities increase the opportunities for citizens, it is the same urban economic development which gives a boost to many disadvantages which have often justified the concept of “unliveable city”, namely economic, social and environmental barriers: inequality, lack of security, poor common spaces, decrease of green areas, traffic, pollution, deployment of natural resources (water, energy), reduction of biodiversity and ecosystems (Colding; Barthel, 2013; Gerometta et al., 2005).

In this tension between opportunities and risks of urban life, livability can be introduced as a condition concerning equity, social inclusion and living quality. Hankins and Power (2009) have underlined how livability is something beyond quality, stressing the importance of the “community” factor. Howley et al. (2009), on this very point, state that only a stronger involvement by community seems to have a positive impact on the perception of livability in citizens. The concept of urban livability has received in last years many different definitions. According to Timmer and Seymoar (2005), livability concerns three main pillars: accessibility, equity and participation. In particular, they underline that ‘[t]he quality of life experienced by citizens living in a city is tied to their ability to access infrastructure (transportation, communication, water, and sanitation); food; clean air; affordable housing; meaningful employment; and green space and parks. The differential access of people within a city to the infrastructure and amenities highlights questions of equity. The livability of a city is also determined by the access that its residents have to participate in decision-making to meet their needs’ (2005: 2). To the extent of this paper, this definition seems the one which better fits the aim to relate livability with quality of time-and-space dimensions in urban daily life. Urban livability, henceforth, relies on a strong connection between physical infrastructure, connecting people to place, and social infrastructure, connecting people to people (Grimm, 2011).

As Bovaird and Loeffler underline, Not so long ago—it was only the 1980s—public services were essentially seen as activities which professionals did to, or for, members of the public to achieve results ‘in the public interest’. Much has changed since then. We now believe that public services should be designed to bring about ‘outcomes’, not just ‘results’, and that these outcomes should, in large measure, correspond to those which

service users and citizens see as valuable, not simply those which are valued by politicians, service managers and professionals. From being a kind of ‘marketeting’ heresy in the 1980s, such views are now largely shared across most stakeholders involved in public services. This has, indeed, been a kind of revolution—‘public services for the public’. (2012, 1120-1121).

Thus, scholars have hugely debate on what ‘make[s] urban living enjoyable’ (Dumbaugh 2005, 283). Last century has showed two different (antithetic) theoretical approaches, also in urban planning: keynesianism versus neoliberalism. On one hand, Keynesianism has shown great limits of economic sustainability (Weisbrod, 1998); on the other hand, Bovaird (2007) points out two other elements: governance drivers, in terms of decline in governance capacity by bureaucracy, and logistical drivers, because of the need of a too high requested degree of flexibility in planning and provision of services. While the Keynesian urban planning has shown these limits, neoliberalism has introduced new risks of splintering urbanism: emergence of premium networked spaces, commodification of public services and financialization of local infrastructure (gated communities) (Graham; Marvin, 2001). Local community interests on social, cultural and environmental issues have been often overwhelmed by economic development per se (Perkins, 2010), even depoliticized (Swyngedouw, 2009) , with severe distortions in urban life (Pestoff, 2006).

Thus, according to several scholars, a “third-way” approach based on third sector initiatives can be seen as a positive opportunity for increasing urban livability. In section 2 some studies on the role of civil society initiatives in urban living have been collected and analyzed in order to show the relationship with urban livability, the intrinsic aspect of social innovation these initiatives have, and the concrete sector where they have got a successful impact. Section 3 illustrates research strategy and the adopted methodology. Main results and a consequent reflection on the concept of co-production follow in sections 4 and 5. Some conclusions and policy implications are suggested in section 6.

2 Third sector and livability: key issues in scholars’ debate

To what extent can third sector initiatives positively affect urban livability? Weisbrod (1998) argues that in wealthy societies urban needs related to mobility, green areas, housing, amenities, become very differentiated and are subject to very fast changes. In such a condition it is very hard for local government to identify exactly people (new) needs and provide them adequate services. Besides, as mentioned above, for profit initiatives often generates in the management of common-pool resources severe failures related to over-exploitation (and depletion) of resources and spaces, problems of market power and, finally, social exclusion. Third sector initiatives, on the contrary, show a good attitude to identify and radically understand citizens’ needs, catch new emergences, introduce new services or new processes in providing them, without neglecting quality.

Scholars from those streams of literature related to co-production, polycentricity, inverse infrastructure (Egyedi et al., 2010) and subsidiarity in local economies and planning, converge on these points above mentioned. Polycentricity, as developed by Vincent and Elinor Ostrom, defines a model where people and their aggregations can - or should - have an active role in both managing commons and even promoting policies. Local community, henceforth, can exactly identify their needs related to urban “times and spaces”: as Somerville (2005) argued, ‘those who are most dependent on the services are those who value them most highly, it follows that they should have the greatest say in how those services are run’. Public or private for profit intervention, according to this approach, should follow and integrate civil society initiatives. An interesting contribution on this point comes from Evans (2002), although focused on liveable cities in developing countries: case studies show how the presence of “translocal actors”, namely non profit organizations, associations, neighbourhoods, encourages and strengthens local initiatives based on the social capital of the same communities; public agencies, in such a context, operates as allies.

In conclusion, the management of urban “times and spaces” is the key issue which have a decisive impact on the level of urban liveability: besides Keynesian and Neoliberal approaches, polycentrism models based on the involvement of civil society seems to show a more effective impact on citizens’ life. Other two main topics from literature, related to the development of this paper, are relevant: the structural attitude to social innovation in third sector initiatives as keystone for their success (section 2.1); which are the sectors or urban life where civil society has shown a positive impact (section 2.2).

2.1 The importance of social innovation in civil society initiatives

Most of scholars put the attitude of civil society initiatives towards urban livability in relationship with the intrinsic social innovation generated within their activities. As Moulaert et al. (2010) state, social innovation signifies satisfaction of specific needs owing to collective initiative, which is typical for those actions which are neighbourhood or small community-rooted, and which stimulate, at the same time, the process of involvement. Thus, why have the third sector initiatives got this attitude to social innovation? A brief excursus on social innovation and its relation with third sector has been here suggested. Since last decade, social innovation has been recognized as a key factor in a broad range of EU policies: ‘social innovation ranges across a wide area of community policies from new models of childcare to web-based social networks; from the care of the elderly to climate change. It is commonly understood as a new policy and management stream field that cuts across traditional domains encompassing notions of novelty harnessed to the active involvement of citizens aiming to address current social challenges’, as stated in Bonifacio (2014). More

precisely, the European Commission relates social innovation to the development of new forms of organisation and interactions to respond to social issues, addressing:

- ‘Social demands that are traditionally not addressed by the market or existing institutions and are directed towards vulnerable groups in society. Approach 1
- Societal challenges in which the boundary between ‘social’ and ‘economic’ blurs, and which are directed towards society as a whole. Approach 2
- The need to reform society in the direction of a more participative arena where empowerment and learning are sources and outcomes of well-being. Approach 3.’ (2011 : 43).

Similarly, Gerometta et al. identifies social innovation ‘with three core dimensions: the satisfaction of human needs (content dimension); changes in social relations especially with regard to governance (process dimension); and an increase in the socio-political capability and access to resources (empowerment dimension)’ (2005 : 2007), which are common in third sector initiatives, their processes, products and services and their impact on local governance.

On this topic, Brandsen and Pestoff (2009) openly stress how civil society initiatives positively affect urban livability owing to social innovation. In particular, they underline two main effects of civil society initiatives: democratization and innovation. These two elements are strictly connected: innovation implies the attitude to provide services for both neglected and new needs emerging in the community, involving the same community in the process (co-production, co-design), generating a stronger democratization; this process usually has an impact in the relationship with public sector and private for profit companies, so that Fyfe, citing Jessop (2002) and his neo-communitarianism paradigm, can state that ‘rather than lying “between” market and state, as Jessop suggests, the third sector is more accurately conceptualised as lying within a triangular “tension field”, the cornerstones of which are the state, the market and the informal sector, with “the characteristics of the landscapes of organisations in the third sector”’ (2005).

2.2 Urban life and third sector: examples of concrete actions

The previous sections offered a synthetic overview on scholars’ contribution about why civil society initiatives can positively affect urban livability, owing to their attitude to innovation. It is interesting to introduce in this section which are the boundaries of civil society intervention in urban life: to what extent, in fact, can third sector affect effectively urban life? Can civil society initiatives influence only few aspects of urban life? Studies on third sector initiatives, starting with Elinor Ostrom’s seminal research on co-production and governance of the commons (1990; 1996), have nowadays provided interesting evidence on the positive output, outcome and social impact of their activities in a wide spectrum of urban life. According with more recent studies, this relationship between third sector and livability is going to increase, as stated by Pestoff:

The third sector is poised to play a leading role in major public sector innovations in the twenty-first century. It can enhance, facilitate, and even promote greater citizen participation in the determination, provision, and governance of public services through the co-production of such services (2012, 1104).

However, while the positive impact of third sector in health and education sectors has been deeply analyzed, new evidence is emerging from research in other sectors (OECD, 2011), not only in developed but also in developing countries (Joshi and Moore, 2004): ‘Civil society has been a neglected partner in urban regimes; its role in shaping the entrepreneurial activities of cities needs far greater understanding’ (Pincetl 2003: 998).

Self-help groups and social support networks are a clear example of direct impact by civil society on urban livability (Bovaird, 2007), but these are only few examples of this attitude. For instance, a wide range of examples come from the above mentioned contribution of Moulaert et al. (2005). Mori, focusing on so called community-cooperatives, an example of third sector initiative, underlines they can provide ‘a variety of personal and recreational services to residents in small neighbourhoods, like running village shops, pubs, cafes and restaurants, community centres, etc., or promoting child care, outdoor pursuits, sports, refurbishment of buildings’ (2014, 338), even utilities, i.e. energy communities (Walker, 2008).

Social housing and co-housing have been deeply analyzed (Mullins; Pawson, 2010) as a field of action for non profit organizations and in particular social enterprises, namely cooperatives, ‘with high levels of volunteering and collective engagement’ (Brandsen; Helderman, 2012) in a sector usually characterized by strong individualism.

Green infrastructure (Pincetl and Gearin, 2005) or urban green commons (Colding; Barthel, 2013), including parks and amenities, have been stressed as positive examples of environmental non profits’ involvement as partners of local governance institutions in planning, management, even fund raising (Brownlow, 2006 ; Perkins, 2010 ; Zukin, 1995 ; Pincetl, 2003). Pincetl underlines how non profits have ‘slimmer staffs, lower salaries than their state counterparts, and do not require the same rates of return as do their business counterparts’ (2003: 994).

Community centres, play areas and sports facilities are another interesting field of urban life where non profits began to provide positive examples of direct involvement in the management of these urban infrastructure (Boivard, 2007), which have drifted away to privately-owned costly areas (Donaggio and Zorzi, 2011). The same risk occurs in urban regeneration, concerning abandoned buildings and places, which represent a great opportunity for third sector involvement (Pares, et al., 2012; Perkins, 2010): ‘a lot of the existing reuse experiences in this field can be thus seen as

occasions for increasing social (and not only environmental) sustainability', according to Cottino and Zeppetella (2009: 7).

In conclusion, many case studies show the positive involvement of non profits in sectors affecting urban livability (beyond health and education), the quality of their services (Weisbrod, 1998) and their innovation (Osborne, 1998, 2010).

Nevertheless, some critics have been raised up, including that 'the development of participatory governance networks is dialectically related to policy outcomes and to prior structural elements like the position of the neighbourhoods within the urban system or the availability and characteristics of the local social capital' (Pares et al., 2012). Furthermore, 'the determinants of such abilities have not been clarified yet' (Mariani and Cavenago, 2013: 1012-1013).

This paper aims at offering a new contribution on this topic, exposing and analyzing some case studies from the Italian urban context.

3 Research Strategy and Methodology

As discussed in the previous sections, from one side, big cities are expected to play a fundamental role in the economic development of countries, as they represent nodes of knowledge, competencies, resources in a fertile network linking all the world's centres. However, livability (declined in terms of accessibility, equity, participation, and sustainability for all the city's dwellers, including elderly, children, disabled people, poor and families in general), represents a critical issue, from the other side. This is true in particular in the present situation, even exacerbated by the persistent financial crisis, further characterized by an increasing social complexity and social vulnerability. We refer for instance to issues like: increasing housing prices leading to problems of affordability; the changing demographic structure (increasing elderly and proportion of immigrants on the overall population), rising youth unemployment and consolidated trend towards temporary work and short-term contracts; changing family relations (single parent with small children and persistent reconciliation issues); fragility of social or family relations, and so on. In the face of these new needs and complexities, only relying on the traditional State response appears to be inadequate. Professional rigidities and self-seeking behaviour commonly found in public sector organizations, along with lasting austerity policies, make Public Administrations (PA) unable to effectively face these new challenges. By contrast, Third Sector (TS) could play a positive role in that, thanks to specific recognized peculiarities. In short, their claimed flexibility and adaptability, a deep knowledge of their client groups' needs and expectations, a focus on results rather than on structural and procedural matters, typical of traditional public sector organizations, and close proximity to the service users, make TS organizations well-placed to provide new innovative ways of providing services (Kelly, 2007). By and large, TS organizations are expected to promote active citizenship and voluntarism, to address social cohesion, to help to reduce social exclusion through civil renewal, or, in other words, to improve livability. To this purpose, specific capacities of third sector organisations are largely acknowledged: i. community integration; ii. giving the respective groups a voice; iii. pioneering innovations in service provision that address groups, situations and/or needs neglected by States and markets; iv. their complementary role in enhancing the qualities of established public services (Pestoff and Brandsen, 2009). Overall, these features are expected to increase cities' livability. However, it is not true that these benefits always occur and that involving the third sector is always good: the empirical research on the impact of TS organizations on the cities livability is still poor and lacks a deep understanding of the micro-dynamics that explains TS behaviour and effects. In other words, if TS organizations are potentially well-equipped to intercept new needs and expectations, it is not clear whether and how they effectively succeed in improving the cities livability in practice. Furthermore, in case of a positive evidence, it is not clear what makes TS organizations able to deliver such good effects.

In the light of the previous discussion, we then formulate the following two research questions.

1. May TS organizations improve cities' livability?
2. What are the qualifying factors that characterize the positive TS organizations' *modus operandi*?

In particular, we rely upon the evidence that in a city there are many subjects, each one with a specific knowledge of new rising problems. We believe that a knowledge advantage allows people and associations to design and offer an answer adequate to the needs of the urban community. This intervention is not substitute of the PA, but it is complementary: in other words, besides Public Administrations and for-profit activities, we see associations of people and families, social enterprises, cooperatives ... which recognize problems, new or neglected, and find an original answer on a local scale. Hence, we want to provide evidence to the effectiveness and relevance of some of these initiatives, sometime at small-scale, but determinant for many people and families, with spillovers over the entire city.

It has to be noted that in this paper we do not consider essential welfare services and deliberately exclude educations and health sectors. We specifically deal with sectors that affect the normal life of families, struggling with common problems, made more severe in big cities¹⁵⁴: housing, mobility, environment, and leisure, which can be thought as setting the typical day of a family.

The TS potential and the underlying mechanism of TS to improve the cities' livability has been studied basing on case study methodology. This kind of qualitative descriptive research has been considered adequate to the objectives of

¹⁵⁴ Cities with more than 250.000 inhabitants.

our paper for several reasons. It allowed us to go in depth to capture peculiarities of various TS initiatives, to highlight their potential impact on the cities livability, to identify some specific effects of their activity, to find out some common specific factors which could explain the related benefits on the dwellers' quality of life, despite the extreme diversity of analyzed case studies.

We selected a set of 19 Italian case studies, basing our choice on the following criteria: the initiatives belong to TS; are distributed across Italy; differ from origin and ideals; are located in big cities, provide services in one of the four considered sectors, are known as best practices on the base of either public documents or recommendations from experts of the respective sector. Case studies had been carried out through a protocol which included an interview to representatives (executives, volunteers, sometime directly one of the founders, in addition also users) in the organization venue, based on a semi-structured questionnaire organized in sections (general information, governance and management, description of provided services and users; origin and motivation, time development, method, relationship with Public Administrations and other private subjects). This information, along with other public documentation (from website, blogs, media, and official documents and reports) was meant to identify distinctive aspects. The sample of the selected case studies is shown in Table 1. Four initiatives refer to Housing, three to Mobility, six to Environment, six to Leisure. Nine are located in Milan and two in Turin (Northern Italy); one in Bologna (North-Centre Italy); one in Rome (Centre Italy); two in Catania, two in Naples, one in Bari and one in Palermo (Southern Italy).

Table 1 Case-studies: sector, city, provided service.

Sector	Case-study	City	Provided service
Housing	<i>Pompeo Leoni</i>	<i>Milan</i>	<i>Social housing for students and other categories of users</i>
	<i>Zoia</i>	<i>Milan</i>	<i>Social housing</i>
	<i>Collegio Camplius d'Aragona</i>	<i>Catania</i>	<i>University student residence</i>
	<i>Villaggio Barona</i>	<i>Milan</i>	<i>Social housing</i>
Mobility	<i>Pedibus</i>	<i>Milan</i>	<i>Accompanying children home-school</i>
	<i>Car Sharing Italia</i>	<i>Milan</i>	<i>Car sharing</i>
	<i>Amicobus</i>	<i>Turin</i>	<i>Carrying and accompanying elderly and sick people</i>
Environment	<i>Boscoincittà</i>	<i>Milan</i>	<i>Realization and management of an urban park</i>
	<i>Orti urbani Garbatella</i>	<i>Rome</i>	<i>Realization of urban vegetable gardens and park „Garbatella“</i>
	<i>Sentieri della Collina torinese</i>	<i>Turin</i>	<i>Reactivation and maintenance of historical tracks on Turin hills</i>
	<i>Orti sociali urbani a Ceglie del Campo</i>	<i>Bari</i>	<i>Social vegetable gardens management with employing disabled people</i>
	<i>Friarielli ribelli</i>	<i>Naples</i>	<i>Cleaning and reclamation of green areas and piazzas</i>
	<i>Piazza S.ta Maria Ausiliatrice</i>	<i>Catania</i>	<i>Revitalization and management of public urban areas</i>
Leisure	<i>Portofranco</i>	<i>Milan</i>	<i>Help in learning and young community centre</i>
	<i>Aperti per voi</i>	<i>Milan</i>	<i>Opening artistic buildings and welcoming visitors</i>
	<i>Cooperativa Parsifal</i>	<i>Palermo</i>	<i>Support to dropping out of school and help in learning</i>
	<i>Centro sportivo Colombo</i>	<i>Milan</i>	<i>Soccer school for kids, young people, and adults</i>
	<i>AD Polisportiva Europa</i>	<i>Naples</i>	<i>Sport courses</i>
	<i>Polisportiva Pontevicchio</i>	<i>Bologna</i>	<i>Sport activities and leisure</i>

3.1 Case studies description

The initiatives belonging to the Housing sector are relatively homogeneous. Pompeo Leoni is an example of good quality apartments offered at moderate rent to various type of users: university students, young families, single parents with children, and elderly people, in the idea to promote an effective integration between people from Milan and outside, and of different age. In the Zoia case the residences (high energy efficiency certified) had been built on a plot belonging to the Municipality of Milan, granted through a tender offer. The tender announcement required a mix of different uses: purchase at a price agreed upon with the concession, and rent at different level of prices (social and

agreed upon). Many additional common services have been provided (janitor, vegetable gardens, childcare centre, community centre for elderly people, daycare for children, bicycle workshop, laundry), in order to support the integration of the miscellaneous community as a whole. Camplus d'Aragona located in Catania (Sicily) is a historical building refurbished, which is not simply a student residence, but also is active in supporting students during the university studies, organizing cultural initiatives open to all the city. Villaggio Barona has been developed at a greater size, arriving to represent a true neighborhood in Milan suburbs. Along with the social housing main service, through the urban regeneration of a disused brown-field site (belonging to a private charitable Foundation) new facilities have been built open to the whole neighborhood (park, nursery school, community centre, auditorium, library) and many welfare-related activities have been promoted.

By contrast, the cases for the Mobility are rather differentiated. As far as Pedibus is concerned, it is not only the organization for accompanying school kids on the way home-school, thanks to volunteers, but it involves other education activities in terms of sustainable mobility, neighborhood history, road safety, orienteering, ... Car sharing Italia was the first initiative of car sharing in Milan, promoted by some members of an Italian environmental association. Only after three years, the Municipality of Milan followed, starting an analogue initiative. Amicobus is a service, based only upon volunteers, for transporting elderly and sick people to hospital, public offices, post offices. The service is not limited to the transport (as it would be the taxi service), but the "driver" physically accompanies and assists the user and wait for him/her until the end of the visit/procedure.

Among the six initiatives in the Environment sector, there are four related to parks and vegetable gardens and two to urban spaces. Boscoincittà has been represented a pioneering experience to create a real wood in the city, as a new park in an area previously cultivated to maize and corn crops. Nowadays, Boscoincittà has been hosting many activities: summer centres, team-building courses for companies, urban vegetable gardens, botanical techniques and collecting/preserving seeds, environmental education for school kids, sports... Orti urbani Garbatella is the initiative promoted by some members of an Italian environmental association aimed at creating and managing vegetable gardens, as a first nucleus of a future park, to be made in a dismissed area, against a previous different decision of Rome Municipality. Sentieri della Collina torinese is an initiative promoted by an Italian hiking association aimed at restoring, opening again, maintaining, and valuing old historical and cultural foot trails on the hills surrounding Turin, accessible directly on foot from the city centre, with no need of using the car to reach them. In Ceglie del Campo, a Bari cooperative has created urban vegetable gardens to involve disabled people as producers of vegetables, sold with success to close shops. Finally, Friarielli Ribelli is an informal group of girls and boys who have promoted the cleaning and reclamation of urban spaces (piazzas) in Naples, planting also trees in some cases. Each initiative is preceded by an awareness campaign on web to stimulate neighbourhood's interest, to involve volunteers, and to maintain continuity in the care of Piazzas. In a similar way, Piazza Santa Maria Ausiliatrice in Catania is an urban space recovered by a spontaneous committee of neighborhoods, tired of its decline. Dwellers have dealt with fund-raising and organized festivals to return the Piazza to the town. Nowadays, the Catania Municipality has formally granted to the Committee, through a tender offer, the regular maintenance and some new investments for improving the Piazza furniture.

As far as the six cases in the Leisure sector, two refer to help in learning initiatives addressed to school students, both based on volunteers. The first case, Portofranco, developed in Milan, is aimed at supporting high school students through a series of services: one-to-one support in specific subjects, tutoring, counseling point, but also conferences and other cultural and recreational events, which make Portofranco a true community centre for adolescents. Parsifal cooperative gives support to junior high school students, signaled as dropping out school, in a really problematic neighborhood in Palermo suburbs. Parsifal volunteers follow kids not only in the learning but also in the educational path and in taking up a career path after the diploma. Three initiatives (Centro sportivo Colombo, AD Polisportiva Europa, Polisportiva Pontevecchia) refer to sport activities addressed to young people, based mainly on volunteers, aimed all at making affordable to many people and families practicing sports. The core service (training in sports) is accompanied by events that make such facilities meeting and supporting points. Finally, Aperti per voi makes it possible to open to public (both tourists and city dwellers) artistic buildings (historical palazzos, churches, stately mansions, ...), otherwise not available for visits because of lack of public resources. The initiative is totally based on enthusiastic volunteers, which welcome and accompany visitors.

Overall, the 19 case studies present some common aspects. As for the ownership is concerned, cooperative, foundation and not-for profit association are found. The organization is very lean, if compared to the number of users. This fact is due to the essential contribution of many volunteers, prompted and endorsed by these initiatives. In addition, this peculiar characteristic makes it the service free for users in many of them. In most cases the service provided can be considered innovative at all, whereas in few cases (i.e., Pedibus, Carsharing Italia, Friarielli Ribelli) the service is inspired from experiences activated in other Italian cities or abroad, even whether adapted to the specific context. Most initiatives have been recent, only five started before 2000. Anyway, all the initiatives had been able to demonstrate their validity both in the offered service and in the adopted approach. This fact is even confirmed not only by many public acknowledgments and formal grants, but also by the capacity of replica in other Italian cities (for instance, Portofranco and Aperti per voi), in addition to the simple evidence of the increasing number of served users for all the examined cases.

4 Main results

4.1 Impact on cities livability and effects on residents and families

In general, livability is defined as “quality of life” as experienced by all the residents within a city or region, however the qualities of a livable city are not univocally defined. In this paper, livability encompasses an array of different issues that are underpinned by a common set of guiding principles: accessibility/affordability, equity, participation, and sustainability. This definition is sufficiently general and completed, and fully in line, for example, with the announcement made in the Europe 2020 Report, which set for our continent a development over than smart (in terms of knowledge and innovation development), also sustainable and inclusive. Within this context, we found that all these initiatives have been proven a positive impact on the cities livability, as they have contributed to improve one of more aspects of livability (affirmative answer to the first research question). More in detail, the affordability principle has been the core element in all the housing initiatives, but it is also incidental to each service provided free of charge (i.e., Amicobus, Portofranco, Parsifal, Aperti per voi, etc). By and large, accessibility can be refer to time and space made more adequate to families needs, constrained by the fast and overcrowded urban life style. Accordingly to this more general interpretation, accessibility means also additional urban spaces made accessible to all the community, like suburban green land taken away either from the state of neglect (Boscoincittà), or from the excessive property speculation (Garbatella); possibility to access artistic buildings and historical paths, otherwise closed or not longer walkable (Aperti per voi and Sentieri della collina torinese); flexibility in the opening hours (aware choice of continuous hours from morning to evening in case of Aperti per voi); practicable paths for weak users (Pedibus, for the safety of pedestrian ways for children, and Sentieri della collina torinese for walking tours suitable not only for expert hikers). In other words, it is about initiatives though really for everybody, which extend the traditional offer of services. Equity is similarly found in all the analyzed experiences, as the solidarity is intrinsically pursued in all the 19 cases. Villaggio Barona is exemplary in that sense: the inclusion of marginalized and weak people and the integration of normality along with disadvantage is the pivot of the life and the organization of the community. Also Orti sociali urbani a Ceglie del Campo is explicitly aimed at the work placement and integration of mental disabled people. More in general, equity can be refer to the integration of a broad spectrum of subjects: among different generations (Portofranco, Sentieri della Collina torinese, Boscoincittà, Pompeo Leoni), among different cultures and nationalities (Portofranco, Villaggio Barona), neighbourhoods and social classes (Orti urbani La Garbatella, Parsifal, S.Maria Ausiliatrice, Friarielli Ribelli), in addition to weaker and disadvantaged people, like elderly and children, unemployed, disabled and sick people (Sentieri della Collina torinese, Amicobus, Pedibus, Orti urbani Garbatella, Villaggio Barona, Orti di Ceglie del Campo). These two elements are aimed at building a city really inclusive, able to attenuate the unavoidable tensions and potential conflicts, and to transform and tunnel the multiple diversities in constructive energy and positive interests. As far as the third aspect, participation, is concerned, the involvement of users and more in general of residents is, in some cases, the logic outcome of the ownership pattern chosen for these initiatives (i.e. cooperative of users like Pompeo Leoni and Zoia). In other cases, they were born as associations of single residents either with a common ideal (environmental protection, solidarity, attention for the community) as in Orti urbani La Garbatella, Car Sharing Italia, Sentieri della Collina torinese, Pedibus, Villaggio Barona, Portofranco, Parsifal, Orti di Ceglie del Campo Aperti per voi, Friarielli Ribelli, Piazza S.Maria Ausiliatrice cases, or with a shared need (Arca, AD Polisportiva Europa, Polisportiva Pontevecchio). The involvement and the relationships between founders, volunteers, users is a natural consequence. Sometime participation comes from the explicit will to adopt a participated design, to favour a deeper social acceptance, minimizing mistrust and prejudices, focusing on the community needs and expectations (Villaggio Barona, Zoia). Finally, even sustainability can be found in many of these experiences, as the protection of the rare environmental resources, in particular in urban spaces, with the aim to conserve landscape and making available to residents and families new green areas, equipped and usable, is the fundamental reason of all the cases in the Environment sector (Boscoincittà, Orti urbani La Garbatella e Ceglie del Campo, Sentieri della Collina torinese). In addition, it can be detected also a tentative to educate people and Public Administration about an attentive management and respect of the environment and of common spaces (Friarielli Ribelli, S.Maria Ausiliatrice). Of course, sustainability is the main reason for pursuing initiatives like Pedibus and Car sharing Italia, but also Zoia and Villaggio Barona have paid attention to it (for example, parks instead of buildings, or energy efficiency certification).

In the light of the received literature (Section 2), we were able to identify some common effects of the analyzed cases, despite their heterogeneity. By accident, it has to be noted that this heterogeneity was an explicit criterion to select our sample, in order to generalize results to a greater extent. In particular, we believe that the added value of these initiatives are attributable to four dimensions:

- Ability to design and provide innovative services
- Increase in the social capital of cities, through the educations of users and the creation of relationship networks
- Improving the quality of common spaces, with in most cases an additional beauty donated to cities
- The solidarity, in terms of qualified services provided not to clubs, but to large segments of residents, including weaker people and groups.

First of all, we detected in all the analyzed cases the ability to provide innovative services: TS initiatives seem to be able to intercept either new or previously neglected needs and to design an original answer. In detail, they behave as

antennas towards the other subjects in the city, signalling to Public Administrations new needs and expectations thanks to their closeness to people, families and community. Examples are Polisportiva Pontevicchio, that in 1957, when PA priorities were building houses, hospitals, schools, highways, etc, identified leisure as a neglected need of residents, satisfied neither by PA nor by expensive and exclusive for-profit initiatives. Even Amicobus has intercepted an unanswerable and innovative mobility demand: the need to accompany and assist elderly people up to clinics or bureaucratic help desk. In turn, the difficulty to find respectable apartments at affordable prices for university students residing out of town (need satisfied neither by council housing nor by market with its high prices) stimulate the answer by La Ringhiera. Strong novelty elements can be found also in Collegio Camplus d'Aragona (inclusion of education and training activities, cultural seminars, in addition to traditional student residence), in Sentieri della Collina Torinese (historical paths rediscovered and restored to city), Boscoincittà (innovative idea to create a wood as an urban park in a previously cultivated land), just as examples. In other cases, the initiatives do not represent first experiences in absolute terms, as they borrow ideas from outside, but the originality stems in the ability to introduce and successfully adapt such practices in the own urban context (i.e., Car sharing Italia, Friarielli Ribelli, Orti urbani Garbatella, Orti sociali urbani a Ceglie del Campo).

As far as social capital is concerned, we identified in all the initiatives a strong relationship-wise dimension, declined in terms of ability to involve people, to attract volunteers, to generate social networks of trust and support. Just as an example, in Portofranco, students (often from immigrant families) working together with volunteers (university students or tutors) has favoured the creation of rapports among teenagers and their families, among retired teachers and young students. Moreover, one of the key factors in the school recovery is that users perceive the free support given by volunteers. Even in Aperti per voi, it may be identified the attachment from volunteers to the involved sites: more than an adoption, a true identification with the sites; the volunteers become the first promoters of their territory and of architectural and artistic goods. Sometime social capital generates from the integration of different subjects in a well-balanced equilibrium. This is the case, for instance, in Orti urbani Garbatella, where the management of vegetable gardens is committed to a variety of users (unemployed, elderly people, school kids, ..), which has encouraged a spontaneous sociality among users and families, with events open to the whole neighbourhood. Analogue tentative to favour an integration among different users may be seen in both Pompeo Leoni and Zoia housing cases. Again, the ability to involve city dwellers in the participation to cleaning and maintenance of urban spaces and piazzas, as in Friarielli Ribelli and Piazza Santa Maria Ausiliatrice. In short, all these initiatives have resulted to educate users to a greater responsibility towards urban common goods and to stimulate a deep attachment to the community.

As far as the quality, we detected a strong attention not only to the quality of service, but also to the quality and beauty of facilities, despite the economic vulnerability of such organizations. Camplus D'Aragona refurbished an old historical building and stimulated analogue works in close buildings in the street. Public acknowledgments had been received by Zoia, Boscoincittà, Friarielli Ribelli, and Centro Colombo, for the quality of project, the attention paid to sustainability and energy efficiency, the care in the maintenance of green areas, the provision of green furniture, the promotion of urban renewal and sanitation. Aperti per voi, a part from the opening of artistic buildings, has started to promote these sites by organizing cultural events, concerts, including it in holidays packages. We may conclude that the relationship between providers and users allows, despite budget constraints, an attention to quality of spaces outstanding. In comparison, for profit subjects are sometime characterized by efficiency but less quality, or high quality set aside only for few high income people.

Finally, we found that such initiatives tend to be open to the whole community, being the service not restricted to specific segments. In this sense, Villaggio Barona is emblematic, as it was explicitly designed to include and integrate disabled and vulnerable people in a open community where "normality" coexists with disadvantage (different kind of residences, services, facilities are in the neighbourhood). However, solidarity can be identified either in the mission (as in Amicobus, Parsifal, Portofranco, Orti sociali di Ceglie del Campo) or indirectly in the attention towards weaker categories of potential users (for instance the distribution of student grants in Pompeo Leoni, Campus D'Aragona, AD Polisportiva Europa).

4.2 Distinctive method and characteristics of processes

The case studies analyzed present of course different origin, scope, sector, method, as they often were born and operate in non conventional contexts, adopt innovative methods, give an answer specific to the needs and characteristics of the local community demand, rarely adopt pre-packaged models. However, in our various sample, we were able to identify some common elements (second research question), that we believe crucial in improving livability:

- Specialization of the offer
- Flexibility in the service provision from one side, freedom and responsibility on the part of users from the other side
- Donated labour, in terms of both volunteers involvement and additional commitment from operators.

In detail, these initiatives tend to keep a specific focus on the original goal and initial mission. They can extend the choice of offer, but only through correlated services which integrate and improve the initial mission. Just as examples, the sport initiatives, that have differentiated during the years the sport activities; Portofranco, that, a part from the simply help in learning, has now added other services: tutoring, orienteering, counselling, but also organization of

cultural events and conferences, excursions, etc. Even Boscoincittà enriches the park by co-operating with schools, firms, and families in the organization of courses, working experiences, summer centres for children etc.

The second element refers to the freedom in enjoying the service and the responsibility requested to users. In Portofranco, users decide how often attend the centre and are requested to personally book their lessons on the specific matters. In a similar way, disabled people, who have worked at Orti sociali urbani a Ceglie del Campo, can rely on a personal job scheduling, tailored on their specific needs.

Finally, we found the ability to involve volunteers and to encourage donated labour from operators, beyond their actual tasks.

In particular, Pedibus, Amicobus, Orti urbani Garbatella, Sentieri della Collina torinese, Friarielli ribelli, Piazza S.ta Maria Ausiliatrice, Portofranco, Aperti per voi, Centro sportivo Colombo, Polisportiva Pontevicchio mainly rely on volunteers contribution for their service provision, while in the other initiatives we detected a strong propension to donated labour expressed in many ways (for instance, in Orti sociali urbani a Ceglie del Campo, operators are used to accompanying home the involved disabled people, etc.). In some cases, the contribution of volunteers allows a cost saving in the management and maintenance of facilities (i.e., Villaggio Barona and Boscoincittà). Amicobus may provide a better service at a smaller price than taxi offer.

Of course, we are aware that these results should be confirmed by extending the sample of case studies and adopting a quantitative research method. In addition, it would be interesting carry out analogue research in other countries, with the aim of comparing for instance the influence of institutional and social context on the success or failure of such initiatives performed by TS. Furthermore, we would like to better deepen issues like the time development, the economic sustainability in the long run, the survival rate, the ability to diffuse the innovative practices in other realities. The role of Public Administration in fostering such positive initiatives finally is worth being better understood. We postpone it to future research.

5 From co-production to subsidiarity

What emerged in the previous sections has pointed out how these initiative, if managed by a single citizen, could not stand; on the contrary, the aggregation around formal or informal associations or social enterprises not only strengthens the single initiative but also becomes a multiplier of social innovation. On one side, these initiatives let city to have back some public spaces which becomes “piazza”, physical infrastructure for social infrastructure. On the other side they strengthen new networks in a fragmented and individual society, a real positive impact for a livable city. Direct consequence of these two aspects is an increasing attitude to respect (1) themselves as a person notwithstanding any problem or disease, (2) the neighbours, notwithstanding any difference, (3) common-pool resources, which become something citizens feel as a shared property and treats properly. These outcomes can be considered as dimensions of social capital: this is the beginning of a virtuous circle where the increasing social capital encourage new initiatives by citizens to improve even more urban livability; as a positive consequence, social capital will keep increasing.

This is the reason why all the third sector initiatives above mentioned cannot be reduced to simple co-production: co-production, in fact, can be a dimension characterizing also gated communities. In these civil society activities, on the contrary, there is not any boundary or limit to the outcome; furthermore, the creation of social capital is inclusive by definition. Thus, while co-production defines a methodology, and polycentricity implies a structure of governance, both do not completely represent the narrative represented in these case studies. The dimension of solidarity, in terms of inclusion of all the citizens, is indeed a constant element of every single case study. They are real examples of subsidiarity, an approach where people is prompt to help each other, not just waiting for a top-down public intervention but exposing themselves and involving those who receive the service.

6 Conclusions and policy implications

Third sector initiatives above mentioned and analyzed are characterized by an important focus on their aims (specialized supply). Nevertheless, it is focusing on their aims strictly related to people needs, that the same initiatives develop new services and new processes in order to satisfy demand (flexible provision). This tension between their focus on a specialized supply and their flexible provision is made possible owing to their highly committed staff, including volunteers, who show increasing levels of donated labour. This attitude has been defined as an important dimension of social innovation (in services and processes), joint to a safeguard of quality services. This important contribution to livability is not exclusive for a gated community, but it is, in most cases, an opportunity for the whole city and its inhabitants (solidarity): re-qualified common spaces, new social ties among people, education to the beauty for all citizens, inclusive solidarity, are impacts shareable in common.

The aim of this paper is not to point out the end of the State or local governments; to some extent the authors of this paper only partially agree with the concept of “governance beyond the state” by Swyngedouw (2005, 1992). On the contrary, urban governance needs a polycentric approach where the role of third sector is recognized not as a mere provider, but a co-producer and co-policy maker in tight connection (Dente et al., 2005) with other public and private institutions at local level, where even conflicts and different interests can emerge and bring to a solution for the welfare and the livability of cities (HABITAT, 2001). What is the role of State in such a context? The answer to this question concerns the policy implications related to this study. The concept of Enabling State, developed in the stream of the

Network Public Management and Collaborative Networks (Balducci et al., 2011; Agranoff; McGuire, 1998, 2003; McGuire, 2006), is quite a fitting definition. In the scientific debate on urban governance during last decade, a key issue has been the more and more diversified demand of specified and not standardized services. Local public actors and State as well are not able to provide adequate services with adequate timing: this is the reason why the State, according to the “deregulation” stream, gives room to other actors, with two often consequences: either it disappears letting the invisible hand to do the job (with bad results sometimes) or it pretends third sector to do even more work than it should do by the same economic and political conditions. It cannot work: the State should not abdicate its role, but it should distinguish those services where third sector initiatives can be just substitutive from those where third sector provision is merely addictive. In both cases, State is required to modify its intervention from exclusively provider to enabler. It implies two main aspects.

First of all, the State should, in fact, make third sector able to provide those services people need: as the case studies show, when a service is required and the State cannot provide it, society often intervenes and co-produces it. However, as Osborne et al. point out (2008), the public policy framework can help third sector by, for example, simplifying State bureaucracy, recognizing economic and financial support, promoting and encouraging both local rooting and openness to international innovations of these initiatives (Cottino; Zeppetella, 2009). A second aspect of this paradigm shift towards the Enabling State is a more radical change of mind: citizens are not “passive” actors, on the contrary they can play an active role in identifying a fragmented demand, planning an innovative and wide range of services, producing and providing them, giving an immediate feed-back and, finally, improving the service.

Besides, but for further research, not every third sector initiative is worth of public enabling: on this very point it clearly emerges, including from this study, the need for an adequate system of evaluation of third sector activity, in particular the metric, the object of evaluation, the method.

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The leverage effect of coordination on interaction work Pareto effects on the design of productivity conformation in social services¹⁵⁵

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Instead of an abstract

A man dripping sweat stands in a wood and saws and saws and saws...Then another man comes around and asks: "Tell me, why don't you grind the saw? You would be much faster!" The first one responds: "THEREFOR I have no time!" (Source: www.pflegeboard.de)

1 Introduction: Four hypotheses to the coordination work and interaction work in social services

Social service work (e.g. caring, psychosocial care) is knowledge work in the form of individual-related and interactive creation of value. Employees in social services for example have to have a comprehensive knowledge and correspondingly professional, methodical, social and personal competences. This also includes the actual implementation of care activities among other tasks like in areas of nursing anamnesis, treatment diagnosis, care planning, care evaluation, procurement of health promotional measures, psychosocial care, as well as the documentation and organization of care. Social service work is 'high-touch work', connected with close and often also incriminating junctions to clients and their relatives. There is a large responsibility: in each individual case employees have to make decisions with immense consequences which impact on participants and other affected people. The dialogue about problems in the job situation is rightly pointed to multitudinous sources of impact (cf. Becke et al. 2013)¹⁵⁶ - for example time pressure, elevated communication tempo, high complexity of working task and of work intensification etc. The length of time spent in social service work decreases as a result of dissatisfaction (cf. Klein and Gaugisch 2005, Bass 2005, Heinze 2011).

Hypothesis 1: Because of the interaction work with clients social services are hardly standardized: "The interaction work is a central condition for the success of the proposal; but it merely is terminally standardized, heavily characterized and therefore connected with a high level of unpredictability. Hence it results from the uno-actu principle also to a certain resistance to rationalizing" (Hartmann 2011, p.77). The efficiency e.g. of a care process among others is dependent on local parameters (logistics, autonomic structural quality of the clients' rooms), and the clients' competence to cooperation (ability and willingness) in the interaction process. Professional routines which specially refer to nursing management (e.g. expert standards of the German Network for Quality Development in Nursing (DNQP) quality testing guidelines of the MDK, cf. MDK 2007) have therefore to be on an individual basis with the result that they have to be attuned to the client's behaviour.

Because of the limited opportunities for standardization and rationalization and also the limited possibility to use technical equipment (lever to help etc.), even social services are afflicted with Baumol's cost disease (cf. Baumol and Bowen, 1966). This means then that increasing incomes in this sector are not or are not enough to compensate for corresponding productivity. The result is a low-pay sector, where people often just work because they are strongly intrinsically motivated, and have other professional ethics than commercial employees (cf. Kumbruck and Senghaas-Knobloch 2006). A result of this dilemma is the development of an extended productivity concept (cf. Evers et al. 2013) and a further professionalization of the coordination work in care adapted to the Pareto principle: "with 20% investment in coordination work attaining 80% more time for effective nursing" (cf. www.pflegeboard.de). This 80/20 hypothesis for social services is investigated in a department of nursing management in an empirical context on the basis of an organizational development project.

Hypothesis 2: In the new research on productivity in social services (cf. Hafkesbrink 2013) it is unclear at present which coordinative and interactive actions should count as value-adding and which ones as transaction costs (TC). Actually in this context, TC are defined as those costs which arise in the establishment and preservation of productive (interactive) value creation. Hence this includes search costs, negotiation costs, control costs to establish and maintain the employment system, organizational costs to establish and maintain the performance, and ongoing costs to pay for the handling, adaptation and control of all internal and external organized transactions (cf. Hafkesbrink 2009, p.94; Hafkesbrink 2013). Particularly, the normative issue as to which of these portions of costs are manifested as a desirable use of resources (for example the direct interaction with clients, the direct arranged coordination of the interactive performance), and which ones involve undesirable waste of resources (requesting or subsequent work concerning the

¹⁵⁵ A modified version of this paper is published in Becke, Guido and Bleses, Peter (2014): Interaktion und Koordination. Wiesbaden: Springer VS. Translation by the authors.

¹⁵⁶ Translation of German quotes by the authors.

suboptimal coordination e.g. of committals, documentations or concerning balloting of clients, employees, relatives, doctors etc.) are unresolved.

The answers to these questions are not only necessary for the definition of a new concept of productivity in social service, as an expedient of the Baumol's cost disease, but also essential for the orientation of measures to improve the productivity of social services (cf. Evers et al. 2013, Evers et al. 2013a, Hafkesbrink et al. 2011). The central question in this context is, whether implemented design measures are able to strengthen the direct productivity (added-value), related-added value or if they strengthen the transaction costs and with this lower added-value processes.

TC can be generally characterized as the costs of coordination of economic performance. The term was coined by Oliver E. Williamson, in order to allow a comparative analysis of alternative institutions or governance structures between market and hierarchies (Williamson 1979). The basic idea is that markets and organizations (hierarchy) create very different transaction conditions for economic operators (cf. Wieland 1998, p.16ff.). The market mainly uses prices (for commodities or services) as a tool for behaviour coordination. Organizations use specific organizational rules or principles, such as different arrangements of working environment, working hours, communication flows, organizational culture, interaction with clients, involvement of clients in the process of service delivery, qualification of personnel, internal and external co-operation, with the aim to position the service best on the market. TC can make these different institutional arrangements calculable and thus transparent (cf. Hafkesbrink 2013). In this sense changes in these institutional arrangements within the meaning of interventions, such as in the context of organizational development processes will have an impact on current operational value and transaction costs for the creation of the service.

Even Richter and Furubotn (1996, p.45) have suspected that, in the knowledge economy, pure TC in the sense of Oliver Williamson (1979) can account for up to 60% of net national product. Own preliminary research in the field of knowledge-intensive media services (cf. Hafkesbrink 2009) and also in the field of social services (Hafkesbrink and Evers 2013) suggests even higher values.

Our hypothesis in this context is: due to the limited standardization in the interactive part of the social service (e.g. time corridors in basic care¹⁵⁷), there is here no further rationalization potential. Nevertheless, in the on-stage area (see Fig. 3) and in the back-stage area as well as in support processes there is untapped potential for rationalization, where further time savings seem possible through effective coordination work. These time savings might then lead to an increase of interaction work. For social services it is relevant to uncover ineffective uses of resources and avoid them. In the present paper we want to emphasize this with an empirical analysis of a social service provider.

Hypothesis 3: Routinization and professionalization as an expression of individual and organizational learning do not only apply to the interactive part of a social service. According to special conditions (e.g. structural quality of the care organization and opportunities for participation of the client) this establishes an optimal value of time availability for basic care services, e.g. for interacting with clients during washing, brushing teeth, getting dressed, etc. This form of routinization and professionalization concerns the individual level between employees and clients. Here the potential for rationalization and productivity improvement is -as already mentioned- very limited.

However, in the coordination work an even greater potential for rationalization apparently occurs. This arises from an effective interaction between individual and organizational learning and - so our thesis goes- which at the same time opens up more space for the needed interaction and empathic work with clients (care, attention, etc.). We argue here, following the 'substitution principle of organization' (cf. Gutenberg 1983), that there is an optimum between balancing improvisation, occasionally regulation and permanent general rules (routines), with which the success of organizational arrangements is maximized (see Fig. 1).

¹⁵⁷ "Guidelines for the assessment of long-term care in accord with the XI. Book of the Social Code" (Bri)

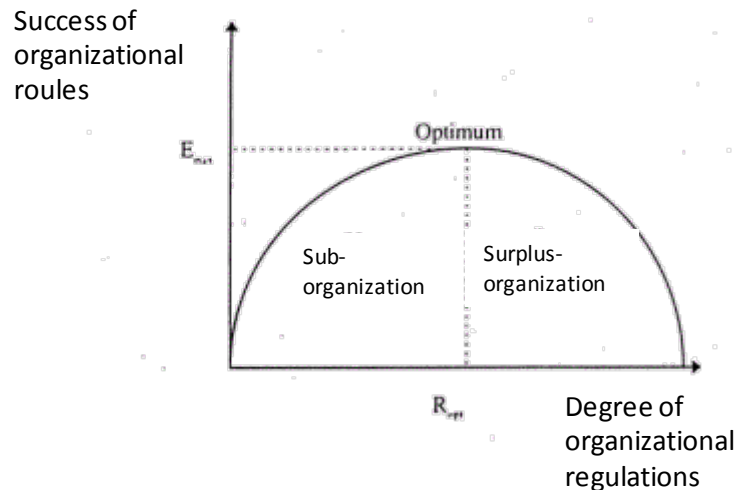


Figure 1. Substitution principle of organization, according to Gutenberg (1983, s. 293) (source: <http://www.bankstudent.de/downloads4/bwl-o3.htm>).

At the optimum point, there is a so-called 'organizational balance', which equally considers the requirements for stability (organization) and flexibility (improvisation). This leads to the current organizational and innovation research, where this organizational equilibrium is discussed under the theme of "ambidexterity" (organizational ambidexterity) (cf. Hafkesbrink et al. 2013). Thus, especially those companies survive permanently on the market that are able to balance resource exploitation and resource exploration (cf. Wollersheim 2010, p. 3). "Thus, exploitation is regularly associated with efficiency-oriented and thus experienced use of resources, while under the term exploration all aspects are subsumed in which a certain capacity for change is reflected that appears essential for the renewal of resources" (ibid., p.7). Considering the specific characteristics of a knowledge-intensive interactive social service such as care, it is immediately clear that a balancing of general and occasional rules and improvisation is necessary.

We now believe that – based on the considered context of balancing coordination and social interaction work- a genuine potential for rationalization in the substitution principle according to the Pareto principle can be realized (80–20 rule of good coordination work). Here it is essential to have an interplay of individual and organizational learning and unlearning, so this potential can be lifted.

Organizational learning, that is the explication of implicit knowledge from the individual level to the level of the organization and its compression to (general) organizational routines, should therefore be pursued as long as the marginal product of routine is not zero. Applied to the practice of coordination work in care services: if I invest in outpatient care in the route planning, then I should do this only as long as the travel times of outpatient care are in fact optimized. A further investment in route planning through intelligent linear or non-linear programming and software is then often not economical because, based on situational conditions (traffic problems), time management in logistics cannot be further improved.

The same applies to organizational unlearning: in certain situations general organizational rules obviously fail, because they lead to an over-organization. The result is that the company is not customizable, can no longer ensure efficient resource utilization with existing resources and cannot develop new resources. A lot of care facilities are mired in exactly this dilemma. Because of socio-demographic changes and the increase of dementia, the demand for social services will significantly change in the future. Dementia sufferers or e.g. psycho-socially impaired people get older, and need extensive help from a combination of care and support services. Palliative care will increase; working in collaborative networks will place new demands on the social service organizations. Sometimes there are organizational and bureaucratic rules that constrict the flexibility of institutions to develop new services (e.g. boundaries in the compatibility between different funding schemes according to the Social Code Book for care and other social services, or the much-lamented documentation requirements). In part, these are general, unbalanced and occasional rules (e.g. frequency of meetings with staff operations planning), but also a mismatch between formal and informal organization (lack of trust culture and appreciation in relation to formal rules) that affect the quality of work in nursing. These have to be organizationally unlearned - if they do not meet a compliance event -, so that there is more time and thus more money for an efficient and effective use of resources. Against this background, our empirical investigation shows how investments in work and cooperation design pay off in a meaningful and desirable use of resources in the interaction work.

Hypothesis 4: Added to this is an aspect which plays an important role in the development of organizations: Following the growth and crisis model of Greiner (cf. Greiner 1998, Greiner 1972) a company goes through certain phases in which growth and crises become detached. This has to do with the fact that in the growth of an organization, states of under- and over-organization repeatedly become detached, depending on the age and size of the organization. Depending on the pressure to innovate from the outside, the company needs organizational learning and unlearning,

form routines, reconsider established routines and create new routines. For very small companies without comprehensive organizational arrangements, work processes are more "chaotic", as communication runs informally, and creativity is important. Leadership is informally by the founders, based on a transformational leadership pattern and enthusiasm. As soon as the company grows and new employees are required, the demand for formal structures arises. The foreseeable crisis of leadership is evident when the founders establish professional management, e.g. a new person in management is added. The company is growing with formal rules that are reaching out as long as it does not come to an autonomy crisis, that is, where individuals can no longer cope individual functions alone. Here new structures and organizational arrangements are needed to perform complex tasks to delegate in a hierarchy. The company is growing via the principle of delegation, and reaches its growth limit with a lack of control. The division of tasks between management and the Head of Department has to be redefined etc. Further growth can be made possible in the subsequent phase only by extensive coordination and thus an increase of formal organizational rules. The structure of cooperation, and the communication within the company, is formally designed in essential parts, which end with progressive growth in a bureaucracy crisis, i.e. the optimum between general and case by case rules in fig. 1 is long exceeded, and the bureaucracy inhibits further growth. In this phase, the company needs a new structure and, moreover, a new culture, more teamwork, and more collaboration, also with partners in the corporate field. Here growth frequently can be achieved only via such external partnerships.

Obviously in this context there are different types or tasks of coordination work at different stages with which the growth path can be managed. In any case, it is to be expected that with such an organizational learning process at least sequential phases of incremental improvement of existing resources alternate with exploitation phases of normatively desirable innovation, i.e. the discovery and implementation of new resource uses. The latter includes innovative work to produce new routines for new activities in the field of social services.

In the present paper our thesis is the following: in a young organization the coordination effort is still relatively high, as it is in the process of organizational innovation, and there is not yet a sophisticated and proven routine in work and service development process. Coordination work in this phase is innovation work; routines have to be formed with appropriate expenditure of organizational experiments. Experiential learning based on the formed routines is not possible in a short period of time. In the transition from innovation to routinization, coordination work can be relieved by general economic organizational rules. The effort for coordination work then describes a declining course for the improvement of existing routines.

This thesis is developed here based on the costs of coordination in the establishment and growth phases of a social service company.

2 Theoretical background

2.1 Coordination and interaction work from the perspective of the institutional economics

First we want to develop a - for our purposes - manageable definition for the terms 'coordination' and 'interaction work'. For this we use concepts from institutional economics' and transaction cost theory.

In the institutional economics (cf. Williamson 2000) the terms "institutional environment", "governance" and the micro level of the involved actors ("individuals") play a major role for the coordination of economic benefits:

1. The institutional framework reflects political, social, juridical and economic principles, value systems, i.e. formal and informal rules, in which economic exchange acts are involved.
2. For "governance", the entirety of institutional arrangements in the sense of coordination, monitoring and enforcement systems for controlling the interactions of economic agents is designated. As "corporate governance" it communicates between the institutional framework and individuals in the economy.
3. Individuals (business entities) with their specific expectations of behaviour and properties are the key players of acts of exchange. They operate under the impact of the emerging governance structures and are socially embedded in them.

Companies are now constantly looking for "governance" forms with which they can minimize transaction and added-value costs. The implementation of these forms of governance, i.e. their establishment, development, continuous adaptation and innovative reconfiguration – can be equated as regards to content with management and coordination work, when combined with various tasks:

1. Coordination work represents the hub between the institutional frameworks and (social) acts of exchange e.g. by implementing compliance requirements for economic activity (e.g. approval of a nursing home) from the control system translated into the necessary skills for the provision of services, i.e. human and material conditions of the institution (keyword "structural quality"). In the language of institutional economics, it is about the 'transfer of property rights'. To use an example from the field of social services, it is a property right to exercise a mobile ambulatory care services among others transmitted towards SGB V and SGB XI. Coordination work also deals with the one-time or ongoing transfer of property rights in markets, such as in the form of initiation activities for cooperation with external third service providers e.g. in the context of establishment of neighbourhood concepts in the healthcare industry or their management and monitoring (e.g.

contract control). Costs which arise in the transfer of such property rights in the context of coordination work are referred to as "*transaction costs in the strict sense*" (cf. fig. 2).

2. Coordination work also focuses on the transfer of property rights inside the organization, e.g. via the development of frameworks for workflow management and process control; via role assignments in the employment system; via the establishment and monitoring of communication systems; via the development of quality assurance systems, etc. Costs which arise in the context of such coordination work are also referred as "*organizational costs*" (cf. fig. 2).

Coordination work can be generally defined as an activity of the transfer of property rights on markets or from the control system and of property rights within companies. The costs involved are referred as "transaction costs in the broad sense", as Fig. 2 shows.

Institution	Market	Companies	
Cost definition	Costs that depend on the transfer of property rights on markets	Costs that depend on the transfer of rights of disposals in companies	Costs that depend directly or indirectly on the production of goods or services
Costs in the new institutional economics	Transaction costs in the strict sense	Organizational costs	Production costs
	Transaction costs in the wide sense		
	Overall cost		
Costs in the neoclassic economics	unconsidered	Only production costs	

Figure 2. Terms and cost demarcation according to the transaction cost theory (source: Möller 2002, p.108).

The demarcation of the terms in this way defines coordination work from interaction work accomplished with the institutional economy and the transaction cost theory: thereafter, as interaction work can be referred to as the direct or indirect activities for the production of a social service via the Uno-actu principle (see fig. 2).

For a more precise definition of interaction work, it is necessary to identify the process types in the provision of services in order to differentiate particular indirect activities with regard to their relationship to value creation. Taking into account the terms in figure 3, interaction within the meaning of productive, directly adding value service activities (i.e., the physical interaction with clients such as caring or counselling) can be separated from coordination work within the meaning of related added -value "On-stage processes" (i.e., visible activities without physical contact with customers, such as coordination of customer affairs with other external contractors). And also to separate these activities from "backstage processes" below the visibility line (i.e., preparatory activities for the provision of customer interaction such as internal team meetings) and support processes (i.e. basic compliance, organizational and training processes) (see fig. 3).

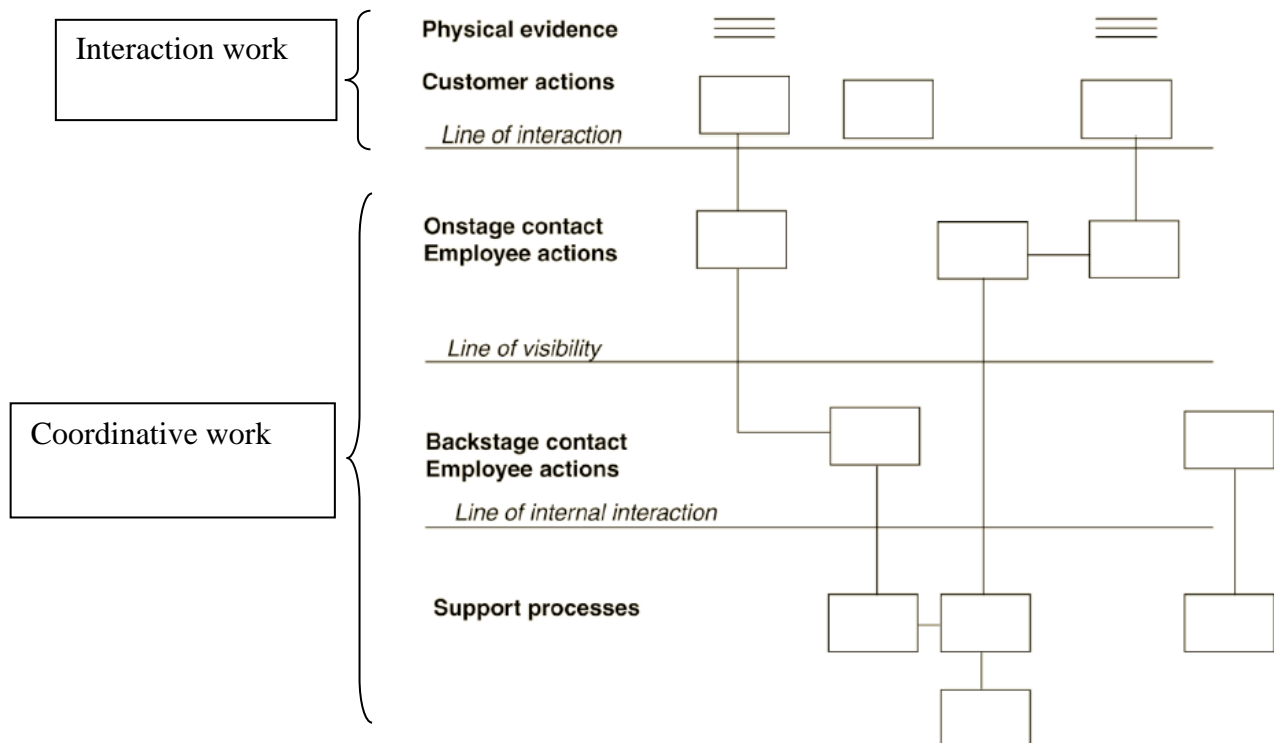


Figure 3. distribution of the types of processes in the field of interactive services (source: *Service Blueprint Components*; <http://www4.ncsu.edu/~hp/MMW-Lecture4.pdf>, varied).

The question remains as to which of these processes are directly value-adding, which are indirectly value-adding, and which are not value-adding and thus are supportive work. Basically one could follow the principle: "everything that the client pays for is directly value-adding". This applies to social services, such as to the performance catalogues of care fund (for primary care) and the benefits groups of health insurance (for the technical care). Thus, for an out-patient care service the travel costs would also be part of the basic care as a billable activity: however, there is no interaction but only coordination work. What is certainly needed for the empirical study is a classification of coordination and interaction work (cf. chap. 2.2.). Finally, the question is to discuss which forms of coordination and interaction work represent a sensible use of resources, and what forms an undesirable waste of resources. Interaction work is initially not suspected to be a waste of resources, because one just generated at all a billable service by these interactive service activities. A non-efficient resource consumption in the interaction work, however, is to assume for those cases where the service provider does not fulfil the interaction routine (yet) in the specifically time. This is if the coordination work (incorrectly or inadequate preparation of the interactive performance) was not effective or the client denied or restricts his involvement in the service process. Coordination work can be divided into planned and unplanned work considering the aspects of resource use / waste of resources. Planned coordination work would then lead to a first approximation to transaction costs for planned use of resources, and unplanned coordination work to transaction costs for unplanned waste of resources (see in more detail the following section 2.2.).

2.2 The Pareto Principle and the leverage effect of coordination on interaction work

2.2.1 How to distinguish between organizational, production and transaction costs of organizational development projects

With regard to hypotheses 1 and 2 (Pareto Principle or 80/20 principle), it is important for further considerations to differentiate between the costs of an intervention (investment organization costs), production and ongoing transaction costs (see, Hafkesbrink 2010).

Thus we define *organizational investment costs* in the context of an intervention all those costs that are incurred once for an operational reorganization project, i.e. costs for the planning of intervention, for external consultancy, for surveys in the company, for the valued proportion of time for employees included in the measures, etc. Basically, these costs are to be equated with so-called "project costs of intervention" connected with the question: "How much money does a company need to invest in order to implement the planned intervention in the organizational structure in the context of a time-limited project?". Therefore, investment costs would show up as "quasi-depreciation" in the organization costs. Thus, in the transaction cost approach, one would distribute the investment-related costs for the planning, development and implementation of intervention measures (cost of project) to the duration of the project in

the form of a pro rata depreciation and charge it as "organizational costs". In addition to these one-time investment-related costs, there are ongoing organizational development costs (OD-costs) as soon as an intervention is aimed at a continuous organizational learning process. Here the recurrent transaction costs of coordinating such OD projects, and the possible costs of external change agents and internal capacities of employment, would be part of the OD project group.

On the other side is the expected benefit. From the intervention in the organizational structure or in the process organization, different beneficial effects are expected which reflect in part as changes in the quality of service delivery and / or in the quantity of resources, which have short-, medium- or long-term effects. The benefit of the measures as initially described, can mean an improvement of qualitative "soft" factors (e.g., performance, motivation); an improvement of products and service quality; and a reduction of the costs of service provision or a change in the transaction costs. Concerning the latter, it is of interest to know its extent and at what time the investment into the organization leads to a payback, i.e. the current organization may cost less and / or allow more space for the desired interaction to work with clients. The empirical case can be mathematically expressed as follows:

$$t = \frac{\text{Investment in the Organization (initial outlay)}}{\text{Average return flow (per year)}}$$

Formula 1. Payback period.

The focus is on the question at which time does the initial outlay (investment in the organization) over the average return per year refinances (e.g. in the form of saved transaction costs). One aim could be to minimize such transaction costs, which represent an undesirable waste of resources, such as unplanned coordination processes, organizational inefficiencies, etc. A second aim could be to design interaction work more efficiently, i.e. the desired coordination work. Both aims lead back to the discussion on the question of the use and waste of resources. The accuracy of the ratio of added-value costs and necessary transaction costs in the field of social services has already been established, is shown in first approaches (cf. Hafkesbrink, 2013). Perhaps one may think of the "organization" as a function of system coordination as an engine up to a certain speed (under "normal load") which has a reasonable fuel consumption. However, under constant overload it consumes exponentially more resources. This image from the everyday experience of many motorists will provide a basis to generate a better understanding of the relationship of the transaction to added-value costs.

The modification of organizational structures and the re-engineering of work processes in this context often establish the need to make work more efficient and reduce costs. However it usually remains uncertain whether transaction- or added-value costs are meant. Anyway, it becomes apparent that organizational processes that are unbalanced, non-transparent, time-critical and uncoordinated and are in a constant state of overload, rather generate high - "negative" (undesired) - transaction costs, optimized organizational structures and processes, vice versa, lead to a reduction of added value- and transaction costs. In this sense, "efficient organization forms" along with a "double dividend" are connected in that they also improve the working conditions for the performance and health of employees, as well as improve the quality of work and results through the creation of scopes with regard to the ratio of value added to output costs (Hafkesbrink 2009). The leverage in this regard is reasonable: by reducing unintended transaction costs via optimized organizational design in favour of a relief in the direct value added costs. At the same time, relatively optimized organizational design offers the option of reducing unintended transaction costs in favour of more flexibility and innovation.

Organizational development projects, from the perspective of institutional economics, thus focus on the design of specific institutional arrangements (design of corporate governance) with the aim to reduce the adverse transaction costs as much as possible, and, at the same time, to produce a double dividend in terms of good quality employees' work.

A distinction is made in this context for the empirical part of the following cost categories:

Added-value costs = cost of interaction work, i.e. all costs that are connected to a direct value-added progress in the service process ("transformation cost" for the interactive core process, that is all activities to increase customer participation, all visible interactive care activities).

Related added-value = costs of coordination work that directly support the core process (e.g. planning, directions, preparatory activities at the client) and are essential for efficient use of resources (on-stage processes).

Transaction costs for Support-/Backstage processes = cost of coordination work that arise in connection with the preparation and quality assurance of organizational performance processes, and sustainably supports the interactive core processes (e.g. development of integrated service concepts, documentation and accounting tasks).

Planned coordination costs = costs of coordination work in on-stage-, backstage- and support processes that are necessary and planned for interactive performance, and the necessary use of resources.

Unplanned coordination costs = costs of coordination work in on-stage-, backstage- and support processes that are unnecessary and unplanned for the interactive services.

Empirically, the question is, through which intervention measures a maximum leverage of coordination on interaction work can be generated in the sense of the Pareto principle, with the aim of reducing the unplanned waste of

resources in favour of the planned use of resources to support effective coordination and efficient interaction work, and at the same time produce good quality work and services.

2.2.2 Framework, indicators and survey methodology for the empirical investigation

The reliable detection of effects of intervention measures in OD projects on cost and benefit factors is scientifically sophisticated as a result of various cause-effect relationships and multifactorial influences. In practice this is done with the help of appropriate qualitative and quantitative indicators, that reflect at least the major part of the decision situation. For our empirical examples, the framework and the indicators used, and the survey methodology, are outlined in order to assess the validity of the results presented here.

Empirical framework: In this paper two empirical cases of intervention measures will be presented in the field of social service agencies:

1. A social service organization that exists for many years, that faces the task of merging various decentralized residences in the area of psycho-social care with different organizational cultures developed over many years.
2. A social service organization which developed as an outsourcing project of a residential care facility that offers outpatient social services (such as counselling seniors) and begins to professionalize their services and organization.

In both cases the relation of coordinative and interaction work is of interest. The focus is on the question of which coordinative work leads to "positive" leverage effects on interaction work? That is, which specific design of coordination work can be developed and implemented that is likely to provide more (cost) efficiency and effectiveness for the interaction work in the sense of "Pareto-leverage"? Does the routinization of coordination work in this context lead to time benefits for interactive activities with clients?

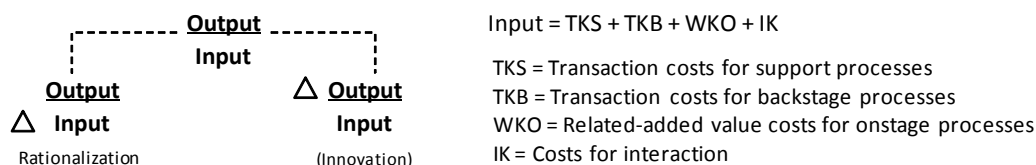
Under (cost) efficiency ("doing things right"), we understand the ratio of output to input (see formula 2), expressed as a cost factor, thus being a more classical measure of productivity, but in the robe of monetary units. The output is the provided service, including human resources and properties, i.e. all coordinative and interactive activities, and other resources, that are necessary to deliver the service. Cost efficiency can be improved at the same output by a lower input, which, in absolute terms, is equivalent to an economy of scale or the same input by an improved output, which corresponds to an innovation effect, e.g. in the form of improving the quality of the service (see again the formula 2).

As effectiveness ("doing the right things") we define the target achievement for the client. Will the mix of personnel and appropriate resources prove satisfactory? That is, is the developed structure and process quality of the facility able to provide a high quality social service organization? The focus of the effectiveness assessment is whether the interaction can be improved with the customer work to provide good, timely, target appropriate coordination work, particularly with regard to more time for interaction work and thus for an improved service quality.

The normative challenge here is to demonstrate the potential of increased effectiveness and efficiency in the sense of balancing high service-quality for the client, service- and cost-efficient provision of the service, and high quality of work (cf. Hafkesbrink/Evers 2013). For this reason, in the choice of indicators and measurement scales as part of the comparative cost no absolute sizes will be used but it is argued with the respective relative (cost) shares.

Indicators used: Against the background described, we choose as indicators various quantitative measures, which we derive from the transaction cost analysis of the social service processes (cf. Hafkesbrink 2013). Thus the desired efficiency and effectiveness improvements are set as follows:

An **improvement of effectiveness** arises when an investment in and routinization of coordination work leads to an improvement of interaction work. Coordination work should prepare efficient and effective interaction work. A good operational planning of a home care service will improve the provision of interactive services to the customer -- the right material and the right skills for the care of a wound at the right time and at the right place will bring better results, as good documentation about the wound makes the therapy course for other caregivers transparent, questions are avoided, etc. The payback for the investment in coordination work is an improvement of time for the customer, improved quality of work (e.g. by time de-stressing) and improved service-quality (e.g. better wound care). In the language of transaction cost analysis, an efficiency improvement is assumed in this context if the current transaction costs for support processes and backstage processes will decrease in favour of more added-value costs of interaction and value creation related costs for onstage processes. In the illustration as a measure (relative number), this would result in the following:



Formula 2. Used measure of productivity for the transaction cost analysis.

There is an **effectiveness improvement** for:

- a) $\text{Output } t_1 - \text{Output } t_0 > 0$ with constant input (innovation effect for the service)
- b) $(\Delta \text{TKS} + \Delta \text{TKB}) + (\Delta \text{WKO} + \Delta \text{IK}) = 0$ (innovation effect for interaction work for $\Delta \text{TKS} < 0 \wedge \Delta \text{TKB} < 0 \wedge \Delta \text{WKO} > 0 \wedge \Delta \text{IK} > 0$ with constant input)
- c) $(\Delta \text{TKS} + \Delta \text{TKB}) - (\Delta \text{WKO} + \Delta \text{IK}) < 0$ (Pareto effect from coordinative to interaction work)
- d) $(\Delta \text{TKS} + \Delta \text{TKB}) - (\Delta \text{WKO} + \Delta \text{IK}) > 0$ (Learning costs from coordinative to interaction work, missing of routines)

When the shift of transaction costs for support and backstage processes is higher than the shift of related-added value costs and interactional costs, a learning process is supposed with associated learning costs. With the increased routinization of the skills, there should be a declining balance in the transaction cost curve associated with a transition to the innovation case a) or rather b) and the Pareto case c).

We measure the extent of routinization by the share of planned and unplanned work (TKS+TKB+WKO) in coordination over time.

An **efficiency improvement** in this classic pattern is present for the case of:

Input t_1 -input $t_0 < 0$ with constant output (Rationalization effect)

Thus, the given output can be provided with an improved utilization of resources with less input. Here transaction-cost analysis helps to identify the sources of efficiency improvement:

- Routinization of coordination work: as long as learning effects and thus economies of scale in coordination activities arise, there are free spaces generated for employees in the sense of work time (e.g. for resource exploration), that is, innovative activities to ensure the ability of organizational change. These could apply to new processes, products or services to develop or to improve the resource exploration (new interaction work) or to establish new routines for resource utilization. In this sense coordination work than is equal to innovation work.
- Routinization of interaction work: learning effects and thus economies of scale in interaction work arise when a professionalization of the exercise takes place, e.g. in the transition from a trainee relationship towards an employment as a professional employee. There also exists the effective presumption of good coordination work on interaction work, namely where targeted coordination work secures efficient interaction with clients. We do not want to speculate about the use of such work time here, but to suggest that this is discussed from the normative viewpoint of improvement of work and quality of service and not under the label of rationalization.

Survey methodology

In the social service organizations, primary research was conducted in the form of a questionnaire survey. It was aimed to separate the differentiation of coordination- and interaction work and added-value work processes, which lead to transaction costs. The employees and (middle) managers of social service-organizations were asked to rate their percentage of working time, they need for specific work processes e.g. for social care of clients, for organizational development, or for documentation activities. This was based on the expert knowledge of employees and managers who had often worked for a long time in the organization. On the basis of their experience, they were asked to assess what percentage of working hours they spent, on average, for the described processes. These were categorized as planned and unplanned work processes, which we have assigned as part of the evaluation of the proximity to the value creation (see Fig. 4)

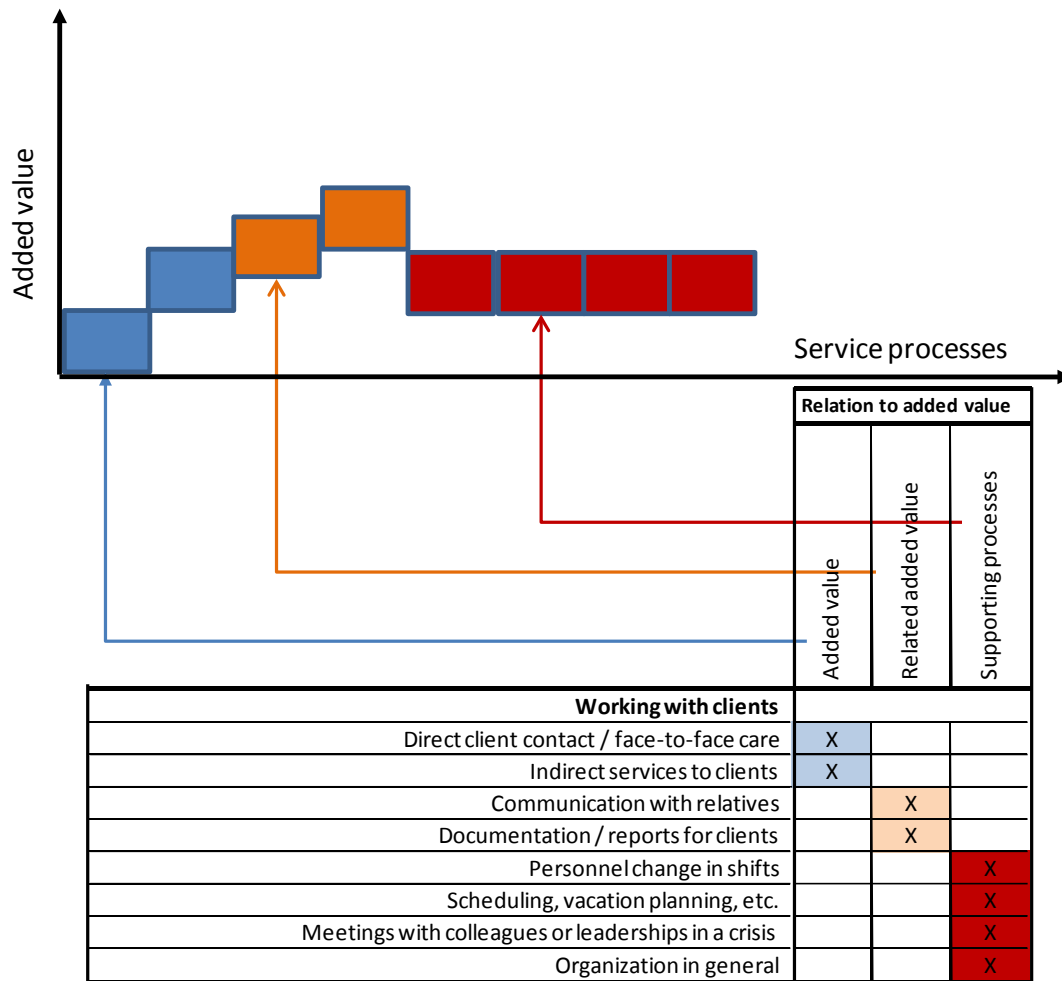


Figure 4. Mapping of care process steps with respect to their contribution to service added value.

The questionnaire survey took place before and after each intervention to reveal the effect of measures to support good coordination work and the dismantling of sub-optimal coordination work for the distribution of value-added and supportive related activities.

3 Empirical results

3.1 Pareto-Effect of coordination on interaction work (case 1)

We tested hypotheses 1 and 2 based on results of two in-patient units for persons with psychic disorders and mental illness.¹⁵⁸ The first questionnaire survey was conducted at a time when no measures had been implemented (baseline) yet. The second survey was conducted after the measures were developed and implemented. At this point, the process of the merger of the institutions was completed; the process of change thus had a defined beginning and a defined end. The questionnaire surveys were conducted in 2011 and 2012. Participation in the questionnaire survey was voluntary and anonymous assessment was carried out. 44 employees and managers were involved in the survey.

A total of 30 meetings were conducted between board, management and employees (and in different combinations of these groupings) as part of the OD-process. The organizational costs invested into the project can roughly be estimated as follows:

- Work time of employees: about 1,150 hours including pre- and postprocessing
- Work time of (middle) managers: about 165 hours including pre-and postprocessing

After the first questionnaire survey the following measures were implemented, which were supposed to support the restructuring of the organization.

¹⁵⁸The research underlying this empirical case relates to the joint research project 8iNNO, supported by the German Ministry for Education and Research (BMBF) and the European Social Funds (ESF), reference number 01FH09003.

Structuring of the overall team meetings' processes:

- Cross-divisional meetings for mutual information
- Organization of joint qualification for efficient competence development and mutual information- and experience discussion
- house newspaper

Structuring of the vertical communication processes:

- Implementation of company meetings
- Regulars' round-table meetings with managers
- Discussion of rumours in the change process, for example, in team meetings

The results of these measures in terms of the development of the working hours for coordination and interaction work are presented and explained below. Here, the coordination and interaction times of managers and employees will be discussed separately because the interactive, added-value work time of managers is naturally lower and the working hours for coordination work prevail.

The results from 2011 and 2012 reveal that both employees and managers show a reduction of coordination activities in favour of an increase of value adding activities due to the implemented measures and instruments (see above), as Figure 5 shows:

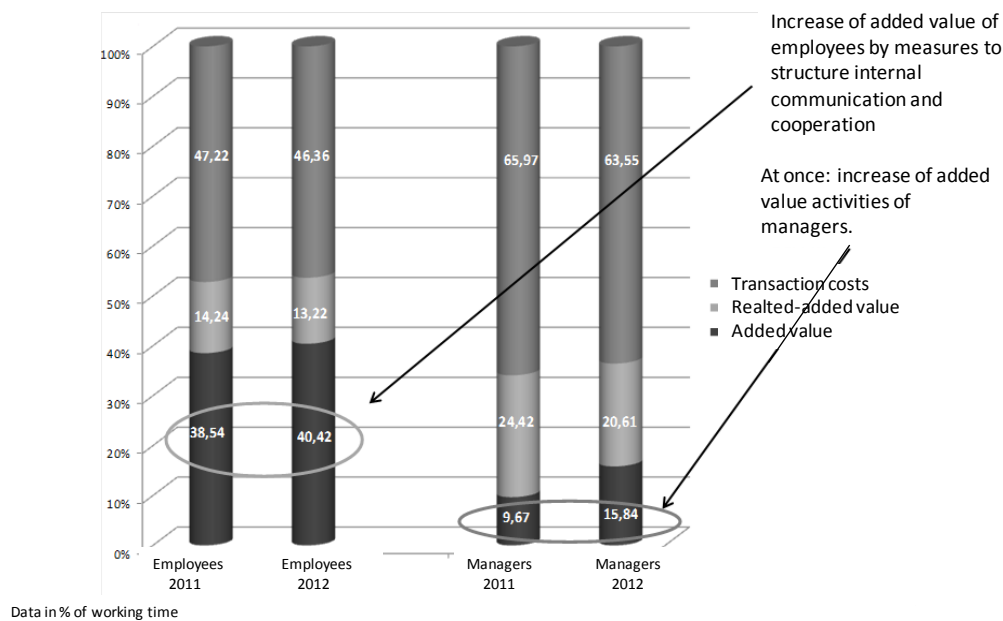


Figure 5. Impact on the cost structure of employees and managers in comparison to years 2011 and 2012 (case 1).

For employees, as well as managers, the organizational development measures lead to a noticeable change of coordinating activities (Fig. 6).

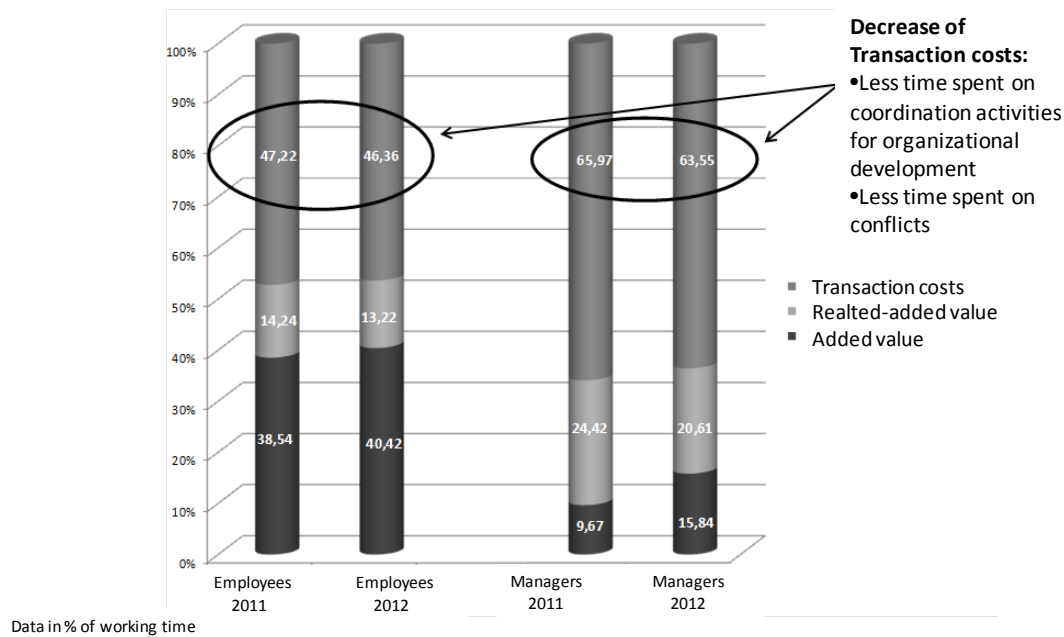


Figure 6. Development of transaction costs in comparison of the years 2011 and 2012 (case 1).

Of interest were also those working time percentages which were spent on unplanned coordination. These unplanned coordination activities were partially caused by negative organisational slack, as they arose due to the sub-optimal organization of the coordination work.

At the beginning of the restructuring process the employees and managers had a high level of unplanned coordination activities. New structures and routines had to be found, and employees were to be involved as often as possible. This led to an overall high degree of unplanned coordination, which leads to the point that managers needed almost 23% of their working time for coordinative activities (Fig. 7).

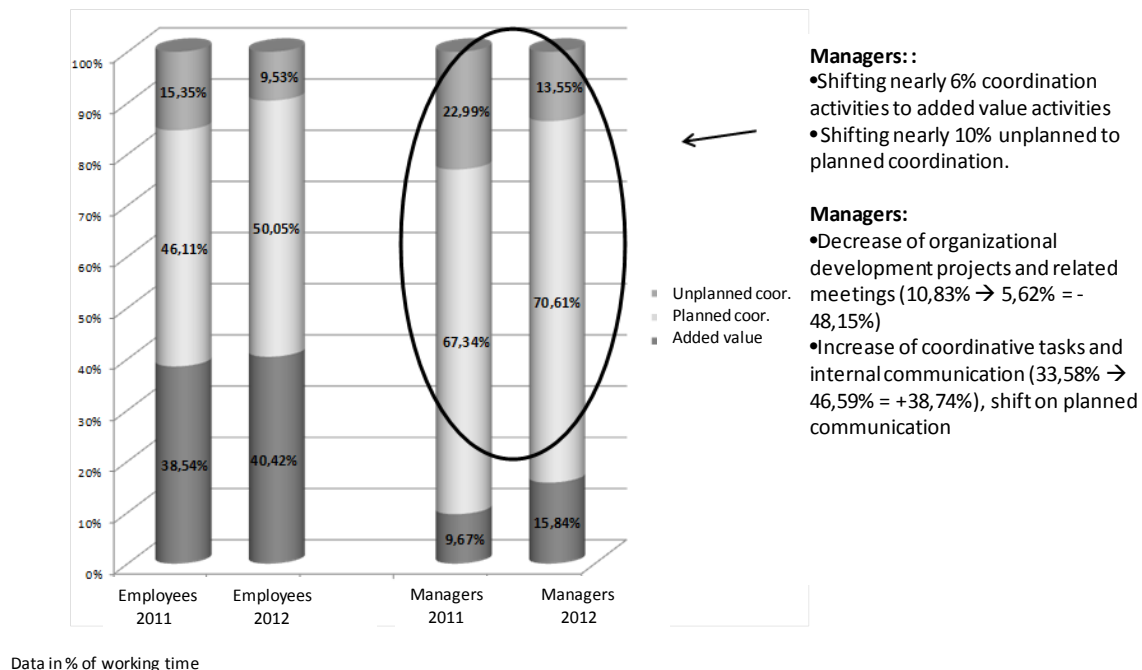


Figure 7. Development of transaction costs in comparison of the years 2011 and 2012 (case 1).

For the managers it became obvious that the measures to structure the vertical coordination processes led to a decrease of information asymmetries and to an increase in reliability. Unplanned meetings in the working process were transferred to planned structures and were less spontaneous. This process also resulted in a decrease of unplanned coordination for employees. Due to scheduled meetings, information could be passed promptly to all employees (and not through spontaneous meetings to just a part of the employees).

The empirical results show that the above developed hypothesis of rationalization potential is applicable in the area of coordination work. Efficiency achievements in the work process were obtained by an appropriate structure of the coordination work in the change process, and working time could be gained for interaction work with clients.

The payback out of invested organization costs can be estimated as follows:

Payback among employees: the redeployment of 1.88% of coordination on interaction work corresponds, on the basis of 42 employees participating in the questionnaire survey, to approximately 1,350 hrs. In relation to all employees affected by the change (60), a reallocation volume of approximately 1,930 hours could be achieved, assuming that the organizational measures apply equally to all employees of the merged residences. With an investment of approximately 1,150 hours in the OD measures a payback period of approximately 0.6 years can be calculated. Thus, after about 7 months, the investment in the organizational change has paid for itself as a gain in efficiency in the interaction work.

Payback among managers: the redeployment of 6.17% of coordination on interaction work (see fig 5) corresponds, on the basis of the two sets of executives involved in the questionnaire survey, to about 210 hours. When an investment of 165 hours in the OD measure is calculated analogously, in a payback period of 0.78 years, i.e. after 9 months, the investment has paid for itself.

The Pareto-effect of the investment in coordination work accounts for employees:

$$\frac{1,930 \text{ hrs. (time saved for interaction work)}}{1,150 \text{ hrs. (Invest in coordination work)}}$$

This corresponds to a leverage of 1: 1.68, that is, every hour invested in coordination work (for the present OD project) provides an increase of 68% in the interaction work.

for managers:

$$\frac{210 \text{ hrs. (time saved for interaction work)}}{165 \text{ hrs. (Invest in coordination work)}}$$

This corresponds to a leverage of 1: 1.27, that is, every hour invested in coordination work (for the present OE project) provides an increase of 27% in the interaction work.

3.1.1 *Routinization of coordination work in the process of organizational learning for the creation of new social services (case study 2)*

In hypotheses 3 and 4, we referred to a social service organization which was founded due to a specific need for pre-outpatient support in the local environment of an inpatient care organization. In the early days, certain sub-organizational arrangements had to be founded and established. The coordination of these services was carried out by part-time managers, and the interaction with the customers by volunteers. Many, if not all, issues of professional and organizational nature were brought to the part-time managers, which lead to time overloads. Structures and routines were still weak. The organization was in a constant process of organizational learning. By participating in a research project,¹⁵⁹ the organization was able to initiate a structured process of professionalization. Full-time employees established structures and routines and, inter alia, new patterns of cooperation have been developed, such as the establishment of local quarters.

At the beginning of the project, the organization had a high percentage of coordination tasks in relation to other comparable in-patient care organizations. The development, implementation and possible adaptation of routines, and the continuous innovation and organizational development process, led to a high coordination effort. Here, the respective phase of development was shown to be relevant for the scope of the coordination work that needed to be done. Besides the coordination between managers and employees, the coordination of organizational development, particularly in the time needed to create a social service organization was important. This coordination, a phase of "trial and error" will be shown in the following as part of the empirical study. Especially in young service organizations, coordination work is essential: structures and processes must be defined and possibly discarded if they are inefficient.

In order to map these phase-related developments of interaction and coordination work, a questionnaire survey was implemented as described in Case 1.

A first survey at the beginning of the project showed that a high percentage of total work time applied to coordinating processes. With an involvement of 15 full-time and volunteer employees a substantial percentage of the employees, in the organization were involved (Fig. 8).

¹⁵⁹ The research underlying this paper relates to a joint research project, supported by the German Ministry for Education and Research (BMBF), reference number 01FL10030.

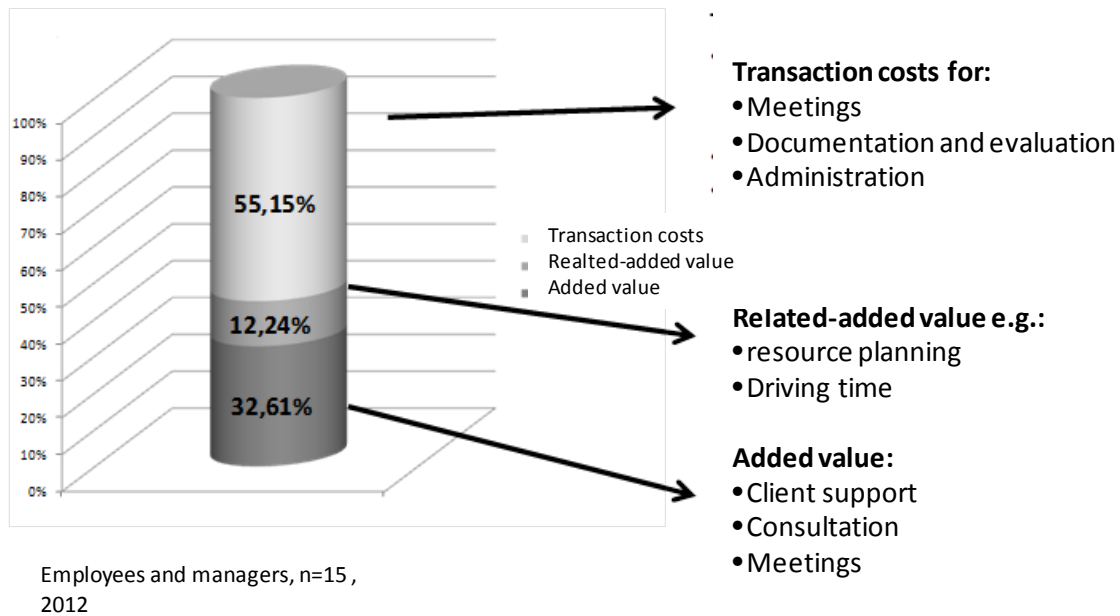


Figure 8. Percentage of work time for added value and transaction costs (Case 2).

As Figure 8 shows, more than half of the working time is spent on supporting processes, such as mutual coordination, but also for administration and organizational development processes. Compared to, for example, established residential care facilities this is a rather high proportion (Evers et al., 2013).

In addition to the proportion of coordinating and interactive processes, it was possible to distinguish between planned and unplanned coordination. The background is that unplanned coordination in the social services occurs quite often, because clients have spontaneous needs or emergencies exist. Nevertheless, this unplanned coordination exists to a certain extent because of suboptimal organizational design, for example, a lack of clarity about processes and decision-making responsibilities (see above). Such uncertainties are particularly not uncommon in the innovation and organizational development phases, as newly developed structures and processes have yet to establish organizational learning. In the organization under consideration here, there was a share of just over 8% of unplanned coordination in the work process.

To obtain suggestions for the improvement of organizational structures and processes, the reasons for unplanned coordination were included into the questionnaire. Results showed that various uncertainties appeared in the work process. So there was a lack of clarity about responsibilities and accountability, as well as unclear communication structures. Frequent demands and less structured opportunities for communication and information sharing in the work process resulted in a high percentage of unplanned work. Moreover, it was the aim of the organization to expand and develop external cooperation in the context of local involvement. For this reason, contact with various organizations in the local environment have been established. However, for this work a clear time window was lacking.

During the project, a gradual professionalization of the employees and the organization was achieved. There were not only established structures and processes for coordination of employees, but at the same time organizational development processes were initiated, which led to a further development and routinization of work processes and corporate structures. In order to better reflect the impact of these measures and instruments, the questionnaire survey was carried out again after about a year. The results of the second survey are shown in fig 9.

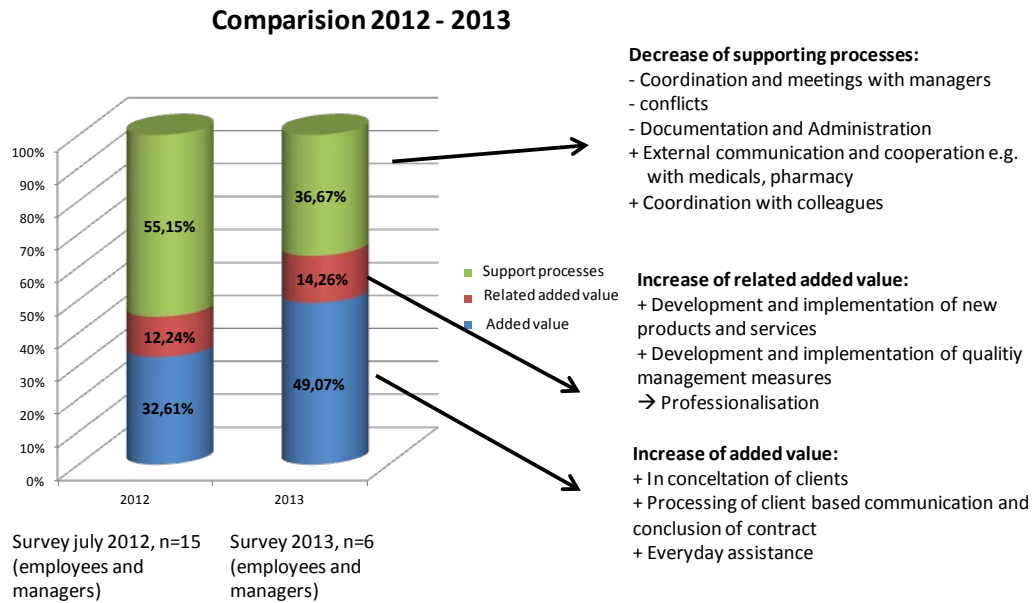


Figure 9. Results of implemented measures (Case 2).

As Figure 9 shows, the implemented measures and instruments helped to increase significantly the proportion of interaction working hours with clients significantly (Pareto effect). The objectives of the relief of the part-time managers and the structuring of communication within the team could also be achieved: the proportion of working time for meetings with employees declined, and the managers delegated tasks and responsibilities. Also, the share of mutual coordination with team colleagues was increased. Thus more working time for the coordination of external contacts arose, which increased local development. The percentage of unplanned coordination was reduced.

The results show that investments in routines and structures that counteract an "under-organization", initially lead to a high coordination effort, as can be seen in the first survey of 2012. However, these new structures, once they were established and recorded, lead to a higher percentage of working time for added-value activities.

In summary, the following effects of implemented measures and instruments were found:

1) Mutual coordination processes were systematized, which led to an increase in working time for communication with colleagues.

2) External collaborations were set up. The mutual proposals with external partners were consolidated. This led to an increase of working time for external communication and an increase in added-value activities that were closely related to customer-related communication with physicians, pharmacies and health insurance organizations.

3) This professionalization also related to the development of new business models, and to reach, for example, new customer groups. This also led to higher proportions of working time for quality management and for the development and implementation of new service concepts for different target groups.

4) The new structures continued to lead to increased working time for the advice and support of clients, and the working time components for interaction (added-value) were increased.

5) The overall result of the organizational development process was an increase of standardization as new structures and processes were developed within the framework of the project.

4 Resumee

Our investigation on the Pareto effect or to the leverage of good coordination work on interaction work (see Hypotheses 1 and 2) was confirmed empirically by the case studies. The leverage in this case of the OD project "merger" was 127% for managers and 168% for employees, i.e. an hour invested in good coordination work may gain 1.27 hours for managers and 1.68 hours for employees.

Our theses on the routinization of coordination work (see Hypotheses 3 and 4) were also confirmed by the 2nd case study (establishment of new social services). It turns out that the routinization of coordination work (decrease of unplanned coordination of 8.3% to 3.3%) led to a considerable professionalization of interaction work (increase from 32.6% to 49% percentage of work time).

From the examples presented here, an important message can be offered to social service organizations that derived from the presented examples: "Sharpen your saw regularly, and keep on sawing as this will lead to better results" Organizational development is worth it!

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Building ‘glocal’ service networks for internationalisation and growth

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This paper brings together theoretical premises of service networks and entry modes used by companies in internationalisation. It explores how companies organise and manage so called ‘glocal’ service networks when combining global and local aspects in downstream service networks. This paper analyses three medium-sized industrial companies and their sales and distribution networks, identifies challenges that the companies face in building and managing glocal service networks, and outlines themes to be addressed with further research. Finally, it concludes emphasizing relational business practices when companies aim at internationalisation and growth via glocal service networks.

1 Introduction

Modern business models that follow the principles of service-dominant logic (Vargo; Lusch, 2008) have changed how the nature of business is perceived from transactional to relational. The change manifests itself in various, often complex service offerings wherein value is co-created in interaction among several suppliers and business customers within a business network (Gummesson; Mele, 2010; Jaakkola; Hakanen, 2013). Services play an important role as a source of specialisation in various global markets. Companies often adjust their service offerings to the characteristics of diverse local markets. Simultaneously, they aim for effective service processes globally. However, companies struggle to address the issue of how to combine *local* presence and the *global* dimension when organising and managing so-called ‘glocal’ service networks.

The trend of ‘servitization’ challenges the network models of manufacturing companies that operate globally. Multiple internationalisation paths and related entry modes are increasingly mixed (Rodriguez, 2007; Kontinen; Ojala, 2011; Ojasalo; Ojasalo, 2011), and companies may act downstream, towards the customer, via several distinct networks of agents, dealers, distributors, and other service providers. The external partners may be responsible for operations conducted locally such as sales, distribution, and after-sales work. Although global service business is commonplace in the business world, research related to the organisation and management of glocal service networks remains sparse. There is a need to study the phenomenon, along with the related challenges that companies face, and to build a research agenda for further, in-depth empirical research on the topic.

This paper brings together theoretical premises pertaining to service networks and entry modes used by companies in internationalisation. It explores how companies organise and manage glocal service networks along the downstream dimension for internationalisation and growth. The paper a) describes and analyses three medium-sized manufacturing companies and their sales and distribution networks and b) identifies the challenges that companies face in the management of glocal service networks. Finally, it c) outlines themes that should be addressed with in-depth research. In terms of the theory, the paper is intended to contribute to the research stream examining service networks by concentrating on downstream networks, which are rarely discussed in literature (e.g., Claro; Claro, 2010; Ehret, 2004; Kalafatis, 2000; Olsson *et al.*, 2013).

2 Theoretical background

2.2 Business networks in the downstream dimension

In addition to engaging in export via company-owned channels, globally operating companies commonly build and manage service networks consisting of several external service providers. The downstream (demand) dimension of business networks includes operations such as distribution, after-sales work, and other services. When one is considering the changes in the offering, it is important, therefore, to look at the demand and supply simultaneously (Holmström *et al.*, 1999; Hilletofth; Lättilä, 2012). Manufacturers need to understand and manage both the processes that create demand for their offerings and the supply network structure needed to meet those demands. It has even been stated that “the supply chain becomes the demand chain” (Christopher; Ryals, 2014).

The networked operations can be organised through various collaborative settings, such as business networks, alliances, and partnerships. A business network is a set of (at least three) connected actors performing various types of business activities in interaction with each other (Axelsson; Johansson, 1992; Halinen; Törnroos, 2005); alliances, on the other hand, involve detailed formal agreements (either equity or non-equity) between/among the business partners (Gulati *et al.*, 2012). In practice, companies may operate in several markets and use different network models accordingly. The networks may be composed of several agents, distributors, and dealers – actors familiar with the local settings of various markets.

A central challenge associated with downstream service networks is the need for companies to tackle the ‘glocal’ aspect of service business. They must simultaneously adjust and tailor their service offerings locally in response to the relevant market’s needs and characteristics and to ensure effective service processes globally with effective, generally standardised processes. How to organise and manage a complex set of downstream networks then becomes a central challenge if one is to succeed in global service business. Still, it is rarely discussed in the domain of service networks.

2.2 International entry modes among medium-sized companies

Entry modes typically refer to an incremental stepwise process of internationalisation. Sharma and Erramilli (2004, 2) define an entry mode as “a structural agreement that allows a firm to implement its product market strategy in a host country either by carrying out only the marketing operations, or both production and marketing operations there by itself or in partnership with others” (see Figure 1). Pan and Tse (2000) divide entry modes into two categories, the above-mentioned equity and non-equity, in view of the considerable difference with regard to investment requirements and control.

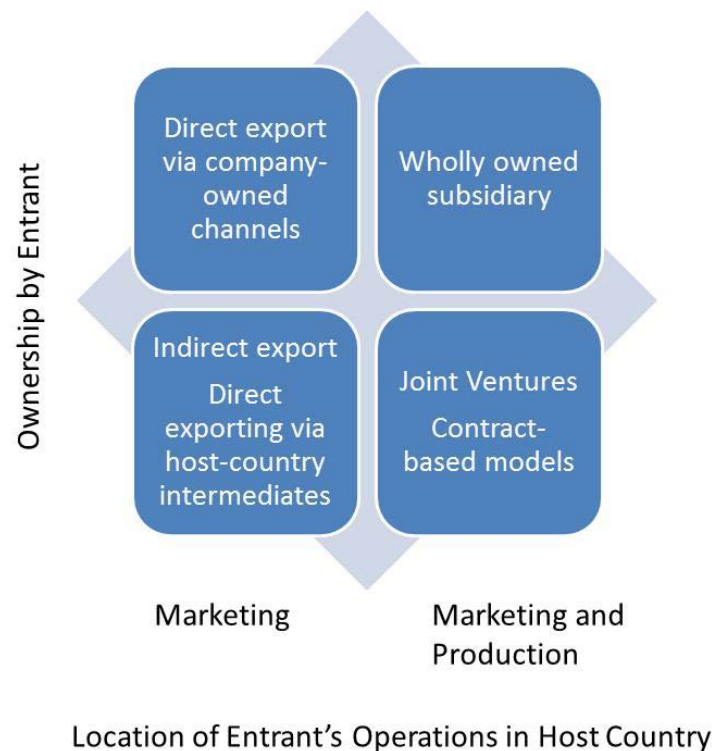


Figure 1. Entry modes by location and ownership (figure adapted from Sharma & Erramilli, 2004).

Research regarding international entry modes has gained increasing momentum among scholars over the last 10 years, and it represents the third most researched field in international management, behind foreign direct investment and internationalisation (Werner, 2002). Most of this research has studied large multinational enterprises (Canabal; White, 2008), although the entry modes of small and medium-sized enterprises have gained more attention recently. Prior literature has identified several internal and external antecedents (typically grouped into host-country- and home-country-specific factors) to the selection of an entry mode. Most of these studies rely on the transaction cost theory and focus on the economic factors that influence firms’ costs and benefits (Brouthers, 2002), although, for instance, the influence of cultural distance on entry mode choices and performance has been studied. However, the conclusions derived from empirical research represent no clear consensus on the effect of certain variables (Morschett *et al.*, 2010).

Johanson and Mattsson (1988) applied their network-oriented approach to the internationalisation of a company. According to it, a company internationalises by creating and maintaining relationships with counterparts in other countries in terms of a) international extension, b) penetration, or c) international integration and co-ordination. In other words, companies export directly to their customers, establish a subsidiary in another country, or manage a network of external partners. Coviello and Martin (1999) consider the selection between a) direct (i.e., based on wholly owned subsidiaries) and b) indirect (i.e., collaborative, network-based) entry modes to be central in the internationalisation of SMEs. Industrial service companies can also internationalise through direct and indirect channels (Grönroos, 1999). According to Grönroos, repair and maintenance services, for example, can be exported directly. A company may also export with a partner or establish a direct subsidiary in a foreign country. Indirect entries entail licensing, franchising, and e-commerce. Furthermore, Rodriguez (2007) emphasises that SMEs do not necessarily follow well-defined international strategies; i.e., more typically they move ahead through ‘trial and error’.

Clearly, companies' internationalisation has been extensively studied over the decades. However, the trend of servitization of industrial companies may still pose new challenges for companies, especially in comparison with the export of products. Services require special consideration of the local aspect, because they are undertaken in interaction between actors. For example, what kind of customer experience and value is expected by customers in various markets and cultures is an issue that has to be considered locally. At the same time, service processes must be designed to be smooth and effective globally. There is lack of knowledge of how to manage the 'glocal' aspect of service business through various downstream network models and of the types of related challenges that companies face in concrete business practice. The purpose of this study is to identify the challenges that companies face in the management of glocal service networks and to outline themes that should be addressed with further in-depth research.

3 Methodology

A qualitative, case-study-based design was selected as the research strategy for the study because 'how' questions were posed in this research, the investigators had little control over events at the companies studied, and the focus was on a contemporary phenomenon within a real-life context (Yin, 2003). The aim of the study, conducted in January–June 2014, was to increase understanding of a previously under-investigated topic (Gummesson, 2000). As the objective of the study was to support the ongoing servitization, internationalisation, and the related systemic change, joint problem-solving between industry and the research community was chosen for its execution. Researchers operated in close co-operation with the case-company representatives and gained in-depth insight via interviews ($n = 19$), themed discussions, and workshops.

Three medium-sized Finnish companies were selected as representative cases (cf. Silverman, 2006) on the basis of the research question: how do companies organise and manage glocal downstream service networks? Each of the case companies aims at growth in global markets, and their central interest is to develop their downstream service networks in order to achieve their strategic aims. All the case companies were already operating in global markets, although they differed in the extent of export and in the stage of development of their sales and distribution networks. Next, brief descriptions of the individual case companies are presented.

3.1 Case-companies

3.3.1 Company A

Case company A designs and implements compact industrially manufactured air-conditioning and heat-pump solutions as bespoke products for projects in several sectors, which involve office environments, hospitals, various industrial processes, electronics, and telecommunications facilities. Company A focuses on high-quality customer-specific solutions, and the projects typically include the design phase, not just assembly. That is, they cover the whole solution instead of single products. The strategic goals of Company A are to increase the proportion of international revenues and to increase the share of service business. All of their solutions feature remote monitoring possibilities, and the remote monitoring can be linked with various levels of maintenance services.

Company A started its international operations in the 90's. Nowadays, the main export countries are Sweden, Norway, and the Baltic States. The company has its own sales offices in Sweden and Norway, and local activities in the United Arab Emirates, the Baltic States, and Russia are carried out through partners. The path to the current situation is typical in that the company built its export operations little by little, sometimes also making side steps and learning from experience. The company have recently devoted significant effort to their most important export areas: In Sweden, they bought their long-term distributor's operations, and in Norway they established a local sales office. Along the way, they have tried export to countries such as Russia also, but sales volumes have varied. At the moment, the most significant efforts are being directed to the Middle East, where Company A has gradually taken a more intensive approach. They started with participation in, for example, the main industry fair in the area, after which they established connections with a local agent. At the same time, they performed many background studies of business in their field in the Middle East. They have hired a new agent, and plan to establish a subsidiary in the region.

3.1.2 Company B

Case company B is a manufacturer of arc welding equipment and a provider of solutions for highly productive welding in several international market areas. The offering includes physical products such as welding machines and barcode readers but also services such as consultation and training. The customers of Company B mainly represent the technology industry, business fields such as shipyard and offshore, transportation, and robot-based automation. At the core of Company B's strategy is strong expansion in global markets. To reach their strategic aim, they concentrate on the development of the solution offering, more effective channel management, and well-executed entry to new markets. Accordingly, development of the sales and distribution network is crucial for the competitive advantage of Company B.

Company B has operated internationally for decades, since nearly the beginning of the company's history. Nowadays, international sales account for around 90% of the production. Company B has its headquarters in Finland, and production and R&D take place in Finland and in India. Some R&D is conducted in China too. In addition,

Company B relies on a wide downstream network of companies responsible for sales, distribution, and repair and maintenance.

With Company B, the typical entry mode for a new market is through distributors. When the market is regarded as offering favourable business potential, a direct subsidiary is established. The subsidiaries take local responsibility for the business. They are in charge of the sales and distribution, and they manage their own stocks and the network of local dealers.

3.1.3 Company C

Case company C develops and manufactures machines for construction, multi-purpose machines, and utility machines for demanding applications. The company is a manufacturer of machinery and equipment for earthmoving, waterway, and environmental work and provides associated services. It specialises in production of machines for demanding conditions, and each machine is built in accordance with customer requirements. The main market area for Company C is the Nordic region, where the typical customer is a privately owned SME or an entrepreneur for whom the machine is the operation's primary investment. A different market segment is formed of larger customers, including public organisations involved in infrastructure construction and the maintenance industry.

The objective of Company C is growth and expansion to new markets. New areas are sought with focused spearhead applications and first with selected key customers. To support internationalisation and complement the offering, Company C recently acquired a business, where the product is more standardised and that already operates via a global dealer network.

The production facilities of Company C and most of its subcontractors are located in Finland and Sweden, which are the company's domestic markets. The operations in Sweden began some years back, after Company C analysed various acquisition possibilities and found a family-owned company there that was looking for a suitable new owner and 'home' for its business. Company C has its own regional salespeople in Finland, whereas in Sweden the sales network includes both its own sales company and sales representatives and independent dealers. Also, there are Norwegian dealers, managed by the office in Sweden.

One partner, a dealer, operates in all three of the Baltic States and has been collaborating with Company C since the 1990s. There are also collaboration partners in other parts of Europe, but sales there have been modest, on account of the economic downturn. In Spain, for example, sales and collaboration with a dealer started very well but ended when the crisis took hold in 2008 (large construction projects in Spain – for residential areas, highways, and even airports – are sitting unfinished). One designated target market is north-west Russia, where a project manager is surveying the market, customer prospects, and decision-makers for Company C.

Maintenance, repair, and spare parts are important services for all customers. The current maintenance network of over 20 companies in Finland was built in the last six years. The spare-parts network is a collaborative effort with another heavy machinery company. In other countries, the dealers are responsible for maintenance and spare parts. The main challenges in the development of sales and distribution at Company C are linked mostly to finding potential markets and building of global networks, since the existing network is small.

4 Results of the case study

The main challenges that the case companies face in internationalisation and downstream networking are as follows:

Entering new markets

- The investments necessary for entering a new market are relatively large for an SME. Hence, there is a need for adequate criteria and analysis, for selection of the most promising ventures for focus.
- Gaining references and trust in a new market. What are the global product features and service-offering requirements that create confidence in products from a manufacturing company, and how can these be identified?
- The brand is unknown. Building a global presence or even visibility in selected locations requires long-term marketing work and attending such events as industry expos.
- A company seeking a work machine wants to see, touch, and test the machine before making the decision. The presence of a demo machine may be a large investment thus conquering new market areas requires a lot of resources.
- There are many competitors, providing varying quality, and new competitors are entering manufacturing company's field from low-cost countries. Their positions vary with the market area. How can entry strategies be planned for the conditions of each market area?

Market and customer understanding

- The offering consists of solutions that bring long-term added value for the customers and also for the customers' customers. How can the company understand the value that the customers appreciate in each market area? What kinds of tools do the sales personnel need for demonstrating the total value that their solutions bring to the customers and the customers' customers in the long term?

- More knowledge is needed about customers, especially of end users and their current ways of working. The existing sales network lacks tools and examples for sales argumentation on the benefits, addressing how to compare this robust, productive, and versatile machine with other ways of doing the same work. Tools related to the offering require improvement, since each machine is tailored (e.g., looking at what new options there are to offer and which options are mutually exclusive).
- Companies lack real-time information about customers and markets when operating through dealers. How can it ensure knowledge flow from the customer interface through the dealers? How can it become familiar enough with its markets and customers when operating via a sales and distribution network?
- Decision-makers, buyers, and the end users are not a single entity; they may all be different actors. Also, this factor varies significantly from one market area to another. Identifying the right parties and approaching them with the right arguments requires good knowledge of the market structure and business culture.

Building downstream networks

- Finding the right collaboration partners is not straightforward, since a manufacturing company operates in a complex field with a large number of actors. With what kind of criteria and channels can the essential partners and those with the most potential be identified in each market, for purposes of ability to operate efficiently globally? How to find the 'right' people, in the right positions?

Organization and management of downstream networks

- Part of the sales and distribution network operates ineffectively, and sometimes the chain from the manufacturing company to the end customer is too long. How can the various sales and distribution channels be organised and managed in different markets?
- In part, the logistics and stock management operate ineffectively. How can the stocks be best positioned in global markets and logistics processes be managed effectively?
- Some dealers experience lack of information from the company. How can the company improve knowledge distribution and training? How can it make sure they have sufficient, real-time knowledge of the products and of the repair and maintenance procedures?
- There is a risk of not all actors within the sales and distribution network acting in accordance with the manufacturing company's brand and operation model. For example, cultural differences may pose an obstacle to coherent operation and customer experience. How can one guarantee a coherent operation model throughout the sales and distribution network yet still take into account the local characteristics of the market?
- More frequent communication between a manufacturing company and the dealer network is needed.

Competences and motivation of the networks actors

- Some actors in the sales and distribution network lack competencies that are needed as the product-based offering incorporates more services that involve software, solution selling and consultancy. How can the sales and distribution be developed in keeping with the changes to be undertaken for the solution offering? How can a company train the network actors and what tools should it use?
- Not all actors in the downstream network are as motivated in the sales work or the co-operation with the manufacturing company. The dealers typically represent several brands, and their motivation to sell the company's machines varies. The network-management personnel lack sufficient knowledge of incentive and motivation factors. How can the company manage, train, support, and motivate the actors in that network? How can it guarantee their value creation?
- Educating and training the network actors is necessary. The products of a manufacturing company are expensive, high-tech machines, and the sales, use, and maintenance of this machinery requires much technical knowledge, expertise, and experience.

5 Conclusions and research agenda

This study presents managerial insight into how companies organise and manage glocal service networks and which are the related challenges. Secondly, it provides a research agenda for further research. The three case descriptions show that the importance of service operations in the studied companies has grown remarkably. Accordingly, their local operations in different countries should be carefully considered when one compares and chooses entry modes and builds sales and distribution networks. Furthermore, the cases show that various internationalisation paths and related entry modes are increasingly mixed, a finding in line with current literature on entry modes (Rodríguez, 2007; Kontinen; Ojala, 2011; Ojasalo; Ojasalo, 2011).

Manufacturing companies; local end customers; and diverse intermediaries, such as agents, dealers, distributors, and other service providers, are the key players in glocal business networks (see Figure 2). The cases suggest, consistently with the service literature (Mathieu, 2001), that the glocal service business involves several third-party service providers, often specialised ones. Therefore, a need is evident for design and implementation of a business network within the downstream dimension if the company is to organise sales, distribution, and meeting the service demands of quite different glocal markets (Häkkinen; Kettunen, forthcoming).

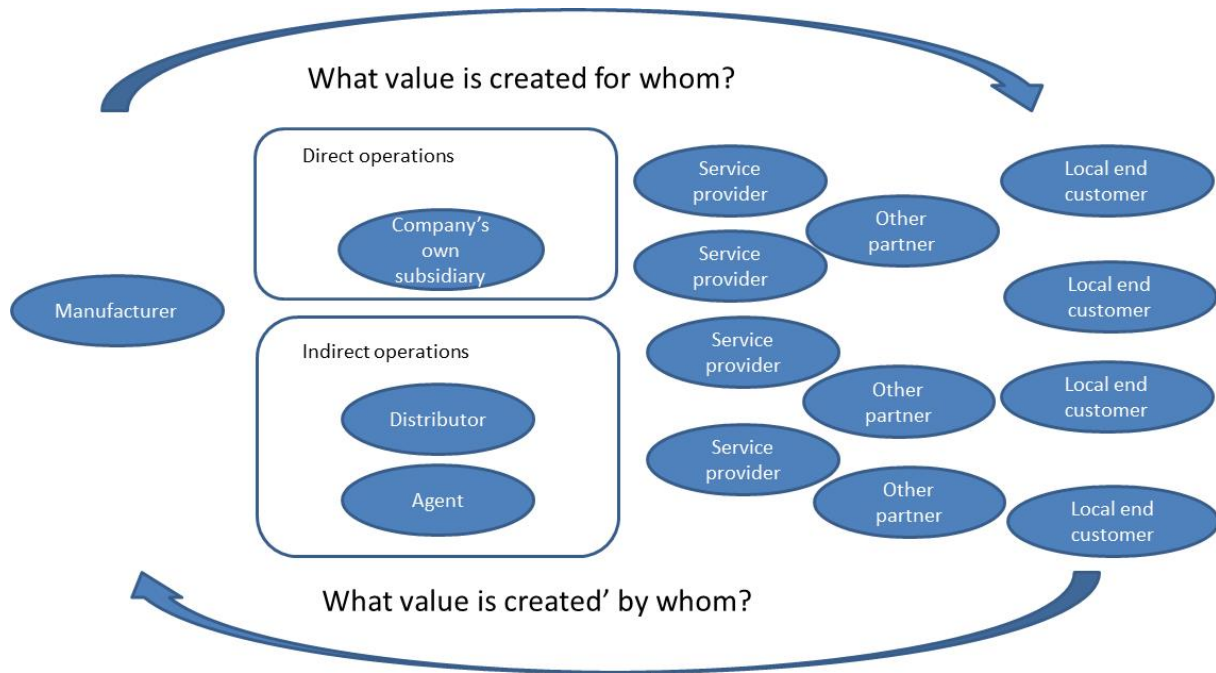


Figure 2. Mapping value co-creation in business networks in the downstream dimension.

It is important to understand the self-interests behind network-configuration choices and partner selection in varied market areas. Therefore, a network model (such as that in Figure 2) designed to map out value co-creation and exchange – i.e., both the value co-created for each actor and the value each actor provides to the others in the business network – could be utilised for further analysis of network configurations. Not all forms of value co-created for multiple actors can be directly measured in monetary terms: they may involve knowledge and other intangible value. Business network actors' commitment to networked operations is rooted in their perceptions about the present and future value added via participation in the network. At the same time, antecedents for networking such as complementary resources and strategic fit between product portfolios influence their choices related to the network.

Nevertheless, the level of commitment to the relationships is often more crucial than the presence of opportunistic behaviour in all of the various collaborative endeavours undertaken. Thus it is that **relational business practices** are needed for ensuring all parties' commitment by clarifying the mutual benefits and building shared understanding. In other words, it is more important to highlight the specific means that partners devise for implementing and operating the relationship that emphasise detailed agreement on goals, responsibilities, and the parties' rights.

Finally, as the result of this study, the following themes could be addressed in future research:

Selecting target markets and building downstream networks

What kind of analysis and criteria is needed in SMEs making decisions on internationalisation? How can one build a suitable sales and distribution network for various markets? More knowledge and tools are needed for finding the local actors that are the most suitable for collaboration in each stage.

Balancing between a coherent global brand and local requirements

How can a company build a glocal brand? A strong and well-distinguished brand supports internationalisation and aids the network with marketing and in building consistent operations. Simultaneously, the local offering often requires certain flexibility in the offering, arising from the needs of the dealer and/or customers.

Ensuring value creation for all actors of the network

How can a company motivate and engage the downstream network partners? This calls for understanding the various factors affecting their motivation and for finding the right incentives and a distribution of tasks that is optimal for the network.

Understanding the culture and motivation of the end customer

How can a company formulate glocal sales arguments? To serve customers properly, one needs to understand the local competition, the customer's business as a whole, and end users' day-to-day work environment.

Focusing on efficiency of glocal operations

How can glocal operations be standardised? There are areas where global optimisation is possible and profitable – e.g., in logistics services. Finding ways of combining local specifications with global efficiency is one balancing-oriented challenge.

Sharing knowledge and communicating

Which means of communication are appropriate for real-time following of changes in the markets and customer needs and of the service process? How can a company utilise new e-business solutions and virtual tools?

Continuously developing the downstream networks and collaboration

Buyers, users, salespersons, and other members of the network need to be trained (in new technology, the company's solutions, the brand, etc.). How to ensure continuous improvement and utilise the innovation potential of the whole network?

However, this study merely opened up the managerial side of the phenomenon and more research is needed on how to build and manage glocal service networks successfully. In order to create new theoretical knowledge on the topic, theoretical ground requires further focusing. In addition, the viewpoints of other network partners could also be included in research.

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Green principles in SMEs innovation activities

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This study explores the effects and future possibilities of applying green principles in SMEs innovation activities. The most significant benefits of developing green innovations were identified such as an increase in revenues, improvement of competitiveness, costs savings, energy efficiency and respect from customers. However, the recognition of the benefits in the early phases of the innovation activities was seen to be challenging. The study revealed that the most significant and probable changes in the future are changes in customer requirements and new regulations and laws required by authorities, which will tighten and change business operations. These influence also on the development of SMEs green activities.

1 Introduction

Green and sustainable innovations are recognized worldwide as a significant part of a competitive business. With innovations companies aim to increase the level of competitiveness, market share, growth, quality, productivity and profitability. By green innovations companies also aim to maintain and advance the condition of the environment and to promote sustainability objectives. Green business means the reduction or prevention of negative environmental effects in business with the usage of clean technology, products, services and processes. This can also be referred as Cleantech business. Challenges related to Cleantech business in Finland are the incoherence of SMEs and a credibility gap in international markets caused by the small size. Especially SMEs and their business activities have strong effects on the growth of the economy in Finland. In addition, SMEs have an important role in European competitiveness by creating jobs, new business ideas, innovations and promoting entrepreneurship.

According to Hilke and Bos-Brouwers (2010), many large companies put a lot of effort on reporting and monitoring of sustainability, but in case of SMEs the amount of published sustainability reports remains very limited. This is due to the characteristics of SMEs, such as resource poverty and lack of public visibility, but also low general reporting priorities of SMEs. Despite of the different reporting activities, the sustainable innovations can bring advantages also for SMEs. According to Clements (2006), SMEs that have good environmental performance, also manage well and are financially the most successful small companies.

The previous literature identifies several benefits that greener ideology and development actions can bring to companies, such as improving company image, new market opportunities and improvements in environmental performance (see e.g. Ameer and Othman, 2012; Hilke & Bos-Brouwers, 2010; Ambec & Lanoie, 2008; Orsato, 2006). However, sustainable innovations are often considered as activities of large companies, and there exists several studies considering merely sustainable business of large companies (Spence, 1999). Characteristics of SMEs, such as the dominant role of the entrepreneur, resource poverty, focus on short term, flexible organizational capabilities, low degree of formalization and strong local/regional focus and customer need orientation, have significant effect on innovation capability of companies (Hilke and Bos-Brouwers, 2010). The objective of this study is to explore the benefits, requirements and possibilities of green principles in SMEs business and innovation activities. To address these issues, the research question of this study is “How green innovations are shown in the development of SMEs business?” The results of the study clarify the effects of green principles on the business and innovation activities of SMEs, and highlight the company- and industry-specific perceptions about the future of green innovations.

2 Literature review

2.1 Concepts of green innovation

Green innovation is a broad concept, which has several definitions in the literature. Terms such as green innovation, ecological innovation and environmental innovation are often used in parallel to determine the concepts of green innovations. Often used term is also sustainable innovation, which is seen as a broader concept including also a social dimension (Schiederig et al., 2012).

Chen et al. (2006) divide green innovation into “green product innovation” and “green process innovation”. In addition, according to Chen et al. (2006), green innovation can be determined as a hardware or software innovation, which means green products or processes including technological innovations related to energy-saving, pollution-prevention, recycling waste, green product designs or environmental management of a company. One way of deciding whether a technological innovation qualifies as an environmental innovation is to consider whether a new technology contributes to increasing eco-efficiency and/or improving metabolic consistency (Huber, 2008).

Fussler and James (1996) define ecological innovation as new products or processes, which create value for customers and business, but par excellence, reduce substantially environmental impacts. According to Beise and

Rennings (2005), environmental innovations are comprised of new or modified processes, techniques, practices, systems and products to minimize or avoid environmental damages. Environmental innovations maybe developed with or without the explicit objective to reduce environmental harm, and they may be also motivated by business objectives, such as profitability or improved product quality (Beise and Rennings, 2005). As a contrast to other innovations, environmental innovations may lead to the so called “win-win” situations, where both economic and environmental benefits can be achieved (Holliday et al., 2002).

In this study, we define the green innovations based on the previous definitions including characteristics from all of the presented terms. The use of the definition “sustainable innovation” was seen too wide concept for the purpose of this study. Due to this, in this study we use the term “green innovation” which is seen as a combination of eco-, environmental- and green innovation characteristics, considering also a bit of the impact of social aspects.

2.2 Green innovation activities in SMEs

Green business is shown in SMEs rather different than in large international companies. 96–99% of all companies are SMEs (OECD, 2005), and thus circa 64% of all emissions come from SMEs (ECEI, 2010). According to Noci and Verganti (1999), the specialty of SMEs means that they innovate in different ways to sustainable development than large companies. Innovation processes of large international companies differ substantially from innovation activities of SMEs, thus similar practices and theories do not work in all-sized companies. Different practices are caused because e.g. the owners of SMEs may often have a dominant role and companies are often focused on the immediate surroundings of the area (Bos-Brouwers, 2010).

According to Jenkins (2009), SMEs have better prerequisites for green innovations because of their flexibility and adaptability. However, the exiguity and lack of resources is a huge challenge when executing innovations in SMEs (Biondi et al., 2002). Jenkins (2009) points out that SMEs should see the exiguity of resources as a challenge that could be overcome with innovations, when the scarcity of resources is good for the innovation capability of a company.

There exist several obstacles and restrictions, which have to be overtaken in order to reach green innovation activities in SMEs. These restrictions are the scarcity of resources, e.g. money, time, technical know-how and knowledge, undeveloped environmental culture, high-risk and unsecure technology, lack of short term strategic thinking, information and knowledge. As the motivators to green innovation activities in SMEs is the pressure from stakeholders: customers, supply chain, consumers and environmental offices and legislations, cost efficiency, reduction of waste and avoidance of risks. By networking and increasing stakeholders are the means for improving the birth of green innovations. (Biondi et al., 2002)

2.3 Benefits of green innovation activities

The previous literature identifies several benefits that the integration of the environmental aspects to the development actions and innovations of a company can bring to companies. The society appreciates the investments to the environment, but among the public benefits, for companies the identification of company profits and other benefits is crucial (Orsato, 2006). The benefits of the development of green innovations include e.g. the product differentiation, improved company image and reputation, increased sales, creation of new markets, and return of investments. Among these benefits, the development of green innovations can lead to significant environmental performance improvements, and thus create benefits for companies but also to the society (e.g. Ameer and Othman, 2012; Hilke & Bos-Brouwers 2010; Ambec and Lanoie, 2008; Orsato, 2006).

The motives to the development of greener business can rise from urge to improve the cost-effectiveness and desire to differentiate the company’s solution from competitors’ offerings. In an optimal case, green innovations can be seen to offer more value to the customer, which together with the improved cost efficiency can increase the company’s competitiveness. (Porter & van der Linde, 1995) In the long run, especially for SMEs expecting to grow, it is important to ensure the sufficiency of resources and energy. By taking the green ideology to the innovation process of the company, can ease the long term planning and make it possible for company to increase the productiveness of the used resources. For forerunner companies green innovations can create benefits such as improved image, differentiation of competitors’ offerings and creation of new markets, which allow companies to set higher prize to their offering. These aspects can lead to higher revenues and help achieving competitive advantage. (E.g. Porter & van der Linde ,1995; Ameer and Othman, 2012)

On the other hand, in many cases the consideration of environmental aspects in product and service development processes can increase costs and thus reflect to customers as higher prices. The argumentation of the green innovation values for the customers is important but also very difficult. Also in the case of SMEs, the focus is often in the short term development actions, which according to Hilke and Bos-Brouwers (2010) often conflicts with the long-term focus and benefits of sustainable innovations.

Development of greener business can have significant effects on company’s economy. In the short term, new ways of acting, new technologies and products can decrease the company’s energy and material consumption. Also new market opportunities and the increasing demand of environmental offering can bring benefits. In that sense the green ideology have opportunities to increase revenues, but also decrease costs. (Ambec and Lanoie, 2008) By improving companies’ development processes, they have also an opportunity to improve the utilization of by-products (Porter &

van der Linde, 1995). By noticing environmental aspects and decreasing the environmental strain, companies can also decrease the amount of costs coming from environmental taxes, fees and environmental protection costs. It also lowers the risk of environmental accidents, which if occurring, can have significant impacts on small company's actions (Lovio and Kuisma, 2004).

Today, the pressure is on developing the condition of the environment and putting effort on protecting the environment. Putting an effort on developing the company's image is important and many customers, as well as employees, appreciate the actions, which enhance the condition of the environment. These actions and increased company reputation can also lead to increases in the motivation of employees. (Chang and Chen, 2013). Reforms of the operations may also raise the interest of investors and financial institutions who want to avoid financing risky businesses (Lovio and Kuisma, 2004). The life-cycle aspect is also one of the characteristic that connects to the green principles. Benefits of green innovations need to be examined through the whole life-cycle of a solution e.g. if solutions are easily disposable, it has an effect on total costs of the solution for customer (Porter and van der Linde, 1995). The benefits of green innovations to SMEs are summarized in Table 1.

Table 1. The summary of the benefits of green innovations to SMEs (e.g. Porter and van der Linde, 1995; Ameer and Othman, 2012; Hilke and Bos-Brouwers, 2010; Ambec and Lanoie, 2008; Orsato, 2006; Chan and Chen, 2013).

	<i>Direct</i>	<i>Indirect</i>
<i>Short term benefits</i>	<ul style="list-style-type: none"> • <i>Reducing the energy and material consumption</i> • <i>Reducing the costs of environmental protection by new ways of action, technologies and solutions</i> • <i>Avoiding the environmental accidents</i> • <i>Safer products</i> 	<ul style="list-style-type: none"> • <i>Increased demand</i> • <i>Special (new) markets for green solutions</i> • <i>Decreasing the amount of by-products</i>
<i>Long term benefits</i>	<ul style="list-style-type: none"> • <i>Predicting the upcoming regulations of authorities</i> • <i>Ensuring the possibilities for growth</i> • <i>Enhancing the productiveness of resources</i> 	<ul style="list-style-type: none"> • <i>Developing the image of the company, reputation</i> • <i>Motiving the employees</i> • <i>Possibility of having an effect on upcoming regulations of authorities by being active</i> • <i>The interest of investors and financial institutions</i>

2.4 Requirements of being green

The previous literature identifies different elements that drive companies towards the development of green innovations. Elements such as regulatory factors, market determinants and internal factors of a company can act as promoting or preventing factors of greener business (see Figure 1). How strong the impact of the characteristics of regulatory factors (such as strictness and predictability) is, depends on the adaptive capability of a company to external pressures. By predicting actions, companies can decrease possible risks and uncertainties. Competitive market situation drives companies to differ their offerings. Besides competing on prize and quality, the companies have noticed the growing attention and interest of sustainability issues and green innovations. In many cases, the most valuable green innovations offer benefits to customers and manufacturers, but also to the environment and society. (Bernauer et al., 2007)

Noci and Verganti (1999) identify two main drivers that drive SMEs towards green business: product and process environmental regulations and increasing social awareness of environmental issues. Especially for small companies, it is important to do preventing actions to fulfill upcoming regulations and emission limits. By being active, companies can also with their own actions have an effect on upcoming regulations of authorities (Lovio and Kuisma, 2004). For small companies, the informatics and effective bargaining with regulators is often easier than for large companies and SMEs are often less problematic to the government. This helps small companies in bargaining for special considerations and gives them room to propose green economic incentives (Scherer et al., 1993; Clements, 2006).

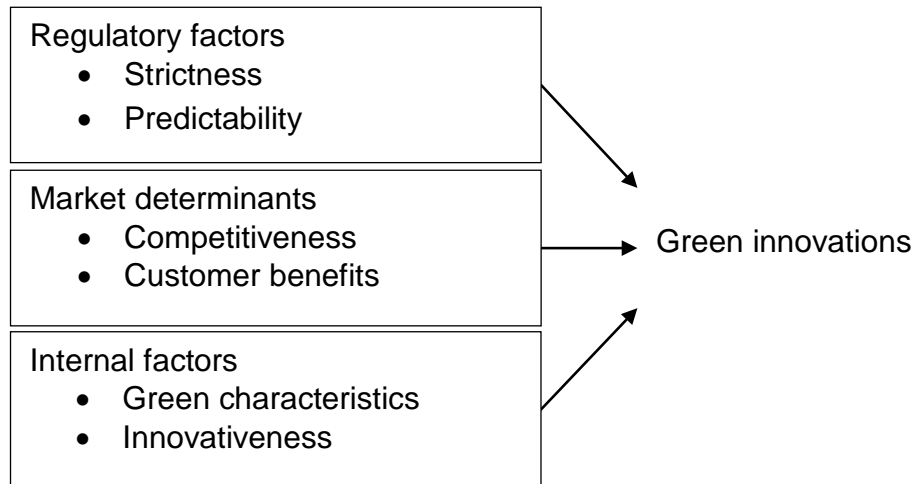


Figure 1. Background drivers for green innovations (Bernauer et al., 2007).

The size of the company usually has an effect on creation of green innovations. New regulations force companies to develop their processes and acquire know-how, which facilitates the development of innovations and improvements. This needs strong R&D activities, and in many times, large companies have more resources to use for R&D and environmental actions than SMEs. (Bernauer et al., 2007) In SMEs green innovations are usually process innovations which are developed to answer the new regulations. In many cases the bargain power of the SME towards their supply chain partners is also lower than in large companies, which makes it difficult to commit stakeholders into certain principles. (Noci and Verganti, 1999)

Implementing green principles into company actions is not an easy task especially for SMEs with limited resources. In many cases, the different environmental programs are quite comprehensive committing the whole organization. The changes usually need investments which can be significant especially for SMEs economy. Also the regulations and social pressure varies both geographically and between sectors, which can cause problems. (Noci and Verganti, 1999)

3 Research methodology

The objective of this study was to clarify the green principles in innovation activities of SMEs. The research approach of this study can be categorized as qualitative, where the data was collected by conducting semi-structured interviews in 12 Finnish SMEs. The companies represented different industries, such as industries related to the waste management, construction industry, mechanical and electrical engineering, and ICT industry. The average revenue of the companies was 10.1 million euros and the amount of employees was in average 33.6. Four interviews were made as phone interviews, one was a face-to-face interview, and seven interviews were conducted via email. The basic information about the interviewed companies is presented in Table 2.

Table 2. Information about the interviewed companies.

Company	Revenue (M€)	Field of operation	Area of operation
1	25	Construction industry	North-Europe
2	3	Industrial solutions	Worldwide
3	-	Stone refinery	Europe
4	13,5	Wholesale business of waste and scrap	South-Eastern Finland
5	3	Electro technical industry	Asia, Africa, Europe, Middle East
6	1	Waste processing technology	Worldwide
7	20,5	Construction industry, heat insulation	Finland and neighboring countries
8	33	Products of environmental technology: waste presses and balers	Nordic countries, Baltic, Russia
	10,3	Waste management	South-Eastern Finland
10	-	Production of electricity, wind power	Finland
11	0,95	IT software for energy and water companies	Finland
12	3,5	Environment industry, construction industry	Finland, Scandinavia, Russia, Middle East, South Korea

The interviews covered five main topics: 1) company information, 2) green principles as a part of companies' operations and innovation activities, 3) benefits of green principles, 4) requirements of green principles for a company, and 5) company- and industry-specific perceptions about the future related to green principles. This study concentrates especially on investigating and analyzing the current state, requirements, benefits and future perceptions of green principles in SMEs innovation activities.

4 Results

Green principles

In the first part of the interviews, the interviewees were asked to describe how green principles are shown as a part of their operations and innovation activities. Companies mentioned energy efficiency in their operations, especially focusing on energy efficiency in the manufacturing processes and the utilization of energy. Other green principles highlighted were such as the improvement of recycling, reduction of landfill, conserving water and chemicals, waste-free production, green raw-materials and the location of raw-materials near the production plants. Companies also pay attention to the raw-materials of their products, e.g. the re-usage of organic products or organic materials were mentioned. Some of the companies mentioned that their products save energy in their customers' business (energy-efficient construction), and in the biggest companies environmental aspects have been taken into account throughout the whole product life-cycle.

The results related to green principles in innovation activities were rather distinctive. The smallest companies, which have no innovation activities, had naturally nothing to share, but also the bigger companies had some difficulties to identify green principles in their innovation activities. Usually green values are seen just one part of innovation activities in SMEs. However, interviewees mentioned the development of processes and products more energy-efficient by means on innovations, disruptive-free operations and the development of electric security.

Benefits of green principles

In the second part of the interviews, the interviewees were asked to describe the benefits of green principles in their business. In general, the adherence to green principles was considered to be positive for companies and their business. The benefits of applying green principles mentioned were as follows:

- Enables the business growth or increases of the revenue
- Certificates have brought about best practices
- Effects in attitudes toward green principles
- Energy efficiency
- Improvement of competitiveness
- Competitive advantage
- Cost savings (e.g. decrease in manufacturing costs)
- Improved visibility and credibility

- General acceptance
- Positive customer feedback
- Customer commitment and satisfaction

One company highlighted the difficulties in measuring the benefits of green principles in the short term, but in the long run, they expect cost savings and an increase of sales when applying green principles in their operations. In the field of waste management, due to applying green principles as a pricing basis, it enables customers act more economically, e.g. when making it more expensive to leave the waste unseparated in a dump.

Requirements of green principles

In the third part of the interviews, the interviewees were asked to highlight the requirements of green principles in their business. In the case companies, there can be found very different levels of environmental know-how. In the biggest companies, environmental know-how is highly developed, and e.g. as a part of an orientation phase of new employees, there can be separate environmental training where environmental aspects of their products are introduced. However, a few of the companies mentioned that they do not have any environmental know-how.

Several companies mentioned that legislative factors are the most significant change in their operational environment that have effected on the green operations of the company. Many companies expect that there will be remarkable changes in the legislation, which will cause new effects and thus brings new changes to their business. Requirements and needs of customers concerning e.g. the amount of waste and cost savings are constantly increasing. The marketing of green values is also getting tougher and the justifications for green marketing are missing from some of the players in the field. In addition, marketing arguments are met differently depending on the geographical locations, e.g. in China the savings in water consumption is more remarkable advantage than in Finland.

Perceptions about the future

Finally, the interviewees were asked to describe company- and industry-specific perceptions about the future related to green principles. Most of the companies were satisfied with their current state of green activities. However, couple of companies brought up the fact that currently they have not received the level they want to be in the future, but development activities are already underway. The study also showed up that if companies want to keep up with the regulations and laws, it requires innovations in several fields. For instance, there are expected to come up clampdowns in the regulations of waste management in the future.

When preparing for changes in the future, one of the companies highlighted that the stakeholders will change and new kinds of cooperation models will develop e.g. with universities. A company mentioned that they are continuously investing in improving their operations, but positions themselves more like a quick adapter than an inventor. Companies also believed that requirements especially from customers are increasing, which drives them to change their practices in order to response the rising customer demands. Only couple of interviewees did not believe that there will be any changes related to green principles in their field. In general, the study revealed that the most significant and probable changes in the future are new regulations and laws required by authorities, which will tighten and change business operations, and in addition changes in customer requirements. Other trends related to green principles in the future were mentioned such as:

- Increasing demand for companies following green principles, e.g. ICT industry
- New regulations for applying green principles in public procurements
- The definition of “green products” is too vague and it don’t necessary have as substantial value in marketing in the future
- The measurement of carbon dioxide emissions in products will tighten and public notifications will be made obligatory, which makes green business more transparent
- The creation of new green products, services and the development of organizational changes are needed in the future.

5 Discussion and conclusions

Based on the results of the study, green innovation activities have not yet been considered and developed enough in Finnish SMEs. The results indicated that companies find it challenging to identify green innovation activities in their own operations. Green values and innovations were considered mainly as product innovations, but other innovation types (e.g. process or organizational innovations) were harder to identify, because the definitions are unclear and the distinction between an innovation and improvement is considered to be vague. Nowadays, green values are merged with several operations, which make the separate inspection of green principles rather difficult.

Also the level of an environmental expertizes varied between companies. In the biggest companies, environmental training is well developed, but some of the companies do not have expertise in the area or it isn’t considered to be necessary. Companies have used the know-how of various kinds of stakeholders, such as environmental consultants and the research conducted in universities. As a conclusion, SMEs which do not have enough resources to apply green

principles in their innovation activities, could utilize more the possibilities of their stakeholders, especially the utilization of their environmental know-how.

The increase of the revenue, energy efficiency, costs savings and respect from customers were identified as the most significant benefits of applying green innovations. However, the recognition of the benefits in the early phases of the product development was considered to be challenging, which makes companies to shun the investments to green innovations. Most of the benefits are seen not until in the long run, e.g. the financial benefits or the increase of reputation. Respectively, companies found it rather challenging to recognize the disadvantages of applying green principles in their operations. However, aspects such as increased purchase prices, diminishes quality, and the diversity and ambiguity of green values were mentioned.

Further, the studied companies found that the requirements are bigger than the received benefits of adapting green principles. One of the major drivers for developing green innovations is the legislative factors. Currently, Finnish SMEs act more as followers than forerunners in the area of green innovations. However, green innovations are found in companies, where the company's business is completely based on green business models. Also the customer demand of green innovations and sustainability is expected to grow. Some of the SMEs have sprung up from the need and customer demand of green innovations. Even though companies were satisfied with their current operations in the area of green principles, to keep up with the competition, companies saw that business development actions are needed in the future. This includes development actions in innovation processes, designing products and services as well as organizational changes. The concepts and requirements of green innovations are about to change in the future, therefore an interesting area for further research would be the identification of new possibilities of green innovations in SMEs and their capability to response to these requirements.

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Tackling the “unknown sustainability” with service design methods: two case studies

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In this paper we will present two explorative service design cases focusing on sustainable services in smart cities. After an introduction to our thematic area we will describe the two cases and the service design methods used. In the conclusion we will discuss the lessons learned from applying service design tools in collaboration with citizens and other stakeholders.

1 Introduction

Quite often “smart city” models are top-down approaches to optimize the consumption of primary resources (such as energy, water, materials and food) and other resources (such as time, money and space). However, “smart cities” do not exist without “smart citizens” that ought to be “smart consumers” (Giovanella; Baraniello, 2012). Moreover, “smart city” infrastructures are run by different representatives of organizations that are stakeholders in co-creating services for and with citizens. This does not mean that the stakeholders should be there to just educate “smart consumers” to behave according to sustainable policies (Giovanella; Baraniello, 2012) but rather providing sustainable everyday services experienced as part of quality of life.

In this paper we are looking at methods for designing such sustainable services. In our two explorative sustainable service design cases presented in this paper we have faced this challenge of integrating the top-down approach of optimizing energy and space consumption with more socially oriented approaches including also individual experiences. In both cases we have had a chance to try out several different service design methods and ways of collaborating with a variety of stakeholders relevant for our design briefs.

1.1 Sustainable service design approach

Service design as a means towards sustainability has, in recent years, received attention both in the private and public sector. Big companies such as DuPont, Hewlett-Packard Co, IBM and Xerox are moving from a product focus to a service focus for environmental, as well as financial, reasons (Rothenberg, 2007). ICT services are considered to have a great potential of reducing energy use in cities (Kramers et al., 2014) and participatory design methods can be used to create innovative and sustainable public services with and for citizens (Manzini; Staszowski, 2013). Services are of course not sustainable per se and service design methods have to be applied with all aspects of sustainability in mind in order to support sustainable service development.

The World Commission on Environment and Development defines sustainable development as development that “meets the needs of the present without compromising the ability of future generations to meet their own needs” and stresses that we cannot address environmental issues alone but only together with social and economic aspects (Brundtland, 1987). Therefore, working with sustainability requires a holistic perspective.

Our approach to sustainable services development is to apply user-centred and participatory design methods in the service design and to include sustainability as a permeating concern through the design activities. Participatory design has been described as a mutual learning activity (Carroll et al. 2000) and in our approach, sustainability is an object of learning between stakeholders through concrete representations of activities and artefacts. We will illustrate these principles with two service design cases.

2 Two cases

Both our cases include multidisciplinary teams that needed a shared vision in the very beginning while communicating about how sustainability can be incorporated into everyday life of the communities we were designing for, within certain technological frameworks.

2.1 CIVIS

The CIVIS project (2014-2016) is carried out by twelve European partners from seven different countries, with backgrounds in Computer Science, Telecommunications, Sociology, Energy and Economics. The goal of the project is to reduce energy use and carbon emissions in smart cities by leveraging on the potential of social networks and communities. This means combining local energy production and data on energy use from sensors in buildings with social interaction in communities and ICT services. A key challenge in the project is how to motivate people to behave more sustainably, and in addition to financial and environmental incentives, the project also focuses on social aspects.

In CIVIS we are designing interactive services for test beds consisting of apartment buildings owned by housing cooperatives in Stockholm (Sweden) and individual homes grouped as energy cooperatives in the Trento area (Italy) but at the same time keeping in mind how the services can be taken into use in other cities in Europe as well.

2.1.1 CIVIS design process

In the first stages of CIVIS we used a modified stakeholder mapping technique, internal storytelling groups, local (per test bed) creation of “user stories”, and “hackathon” events as service design means.

User stories and hackathons are our most important modifications to a traditional user-centred design process. User stories are narratives produced by project stakeholders to agree on a common vision. Hackathons are intensive design and implementation contests where people from outside the project are given energy and social data, user stories and other inputs and are asked to create service concepts.

The need for these changes comes from the way the project was initially specified, with not many resources allocated to exploring the design setting. Therefore we first started with the internal project team and only later included citizens and other external stakeholders into our vision work. The initial activities did not include any involvement of citizens and we needed buy-in from the other partners before engaging with people in the test beds. Instead, the initial focus was on using the methods to agree internally on a vision, create a common understanding of the contexts of the test beds and expressing individual research interests of the different partners. Agreeing on a common vision with twelve partners on a complex topic like sustainable service design was thus our main challenge.

Our next step is to increase the involvement of test bed stakeholders to further analyse the context, create and implement solutions, and test and evaluate our ideas. To add to the ideation phase we are also planning to arrange more hackathons as part of an iterative process. We will provide data generated by sensors in a couple of households to the participants via a prototype ICT platform, then test the best concepts and with the input from that adapt the data collection and platform.

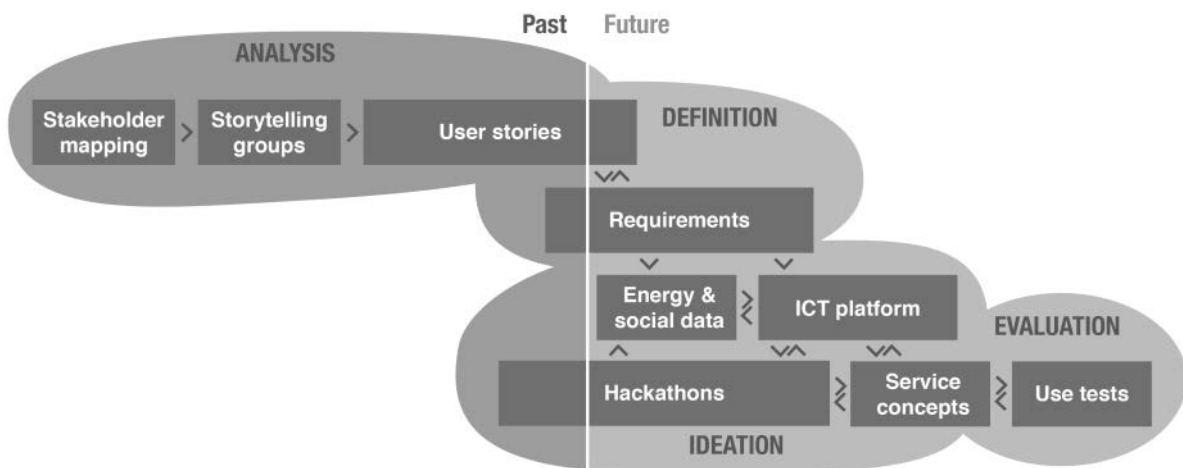


Figure 1. Design process in CIVIS up to now and with preliminary activities for the future.

2.1.2 Service design methods in CIVIS

Stakeholder mapping

In the very beginning of CIVIS project we asked different stakeholders from both the Stockholm and Trento pilot sites to draw a personal map illustrating people, organizations, artefacts and places relevant to the pilot site activities. We instructed the stakeholders in our face-to-face meeting to draw and write on their map how these different elements are linked to each other and what kind of value they create for them. Moreover, we asked the stakeholders to mark with red and write descriptions on the map if there were any obstacles for them to participate in CIVIS. This service design tool helped us to get an overview on what kinds of activities the different stakeholders have related to CIVIS sustainable goals. It also helped us realize that the two different test beds – Stockholm and Trento – have very different ecosystems that we will have to adapt our work to.

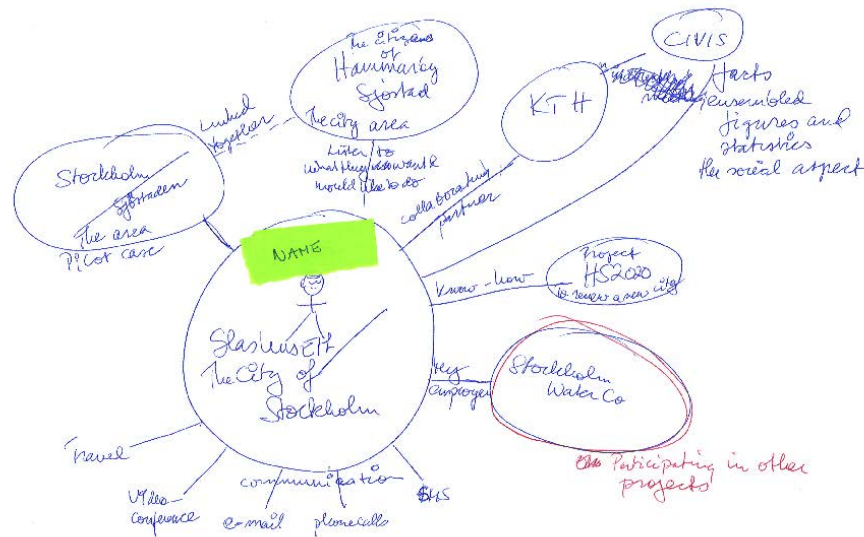


Figure 2. Stakeholder map by one of the participants.

Storytelling groups with internal experts

In order to create a shared vision among the partners in the multidisciplinary CIVIS project early on, we organized a use scenario workshop for all project members. In the workshop we applied a service design technique called *Storytelling group* (Kankainen et al., 2012) that combines narrative use scenario creation and focus group type of discussion. The purpose was to start an internal discussion on our project goals and find a common language to discuss about them. As an outcome of this workshop we got several narrative use scenarios for the two test beds. Moreover, in the discussion parts of the workshop we clearly had better shared understanding on our project goals and local energy use practices in the two pilot sites.

User stories

According to the project specification we were supposed to produce use cases as one of the first outputs of the project. However, we decided that use cases were too formal and too detailed, and were not grounded in test bed realities or in stakeholder interests. Instead we worked with narratives, which we in the project called “user stories”, including fictional characters of the test beds taking a number of actions to reduce their energy use and carbon emissions, and other actions that would lead to a more sustainable life and city. Since the test beds differ in many aspects we assigned the responsibilities of the stories to partners with good knowledge of the respective local context.

We continued with building on the draft narratives of the storytelling groups during workshops including only project members who are familiar with the respective test bed. For the workshops we prepared props representing the characters, the places they move between and technologies they might use. With the props the workshop participants drew up the stories of how the characters interact with each other through various tools and which behaviours this can address. The stories were written down and shared with all project partners for feedback, both written and during online sessions, in several rounds. With the stories we were aiming to create a tangible picture of what the project vision and the research interests of the partners would mean for the people in the test bed and their energy related habits and decisions. During the many revisions of the stories they went from being rather ordinary to being more visionary and better representing the goals of the project, with clearer descriptions of sustainable practices.

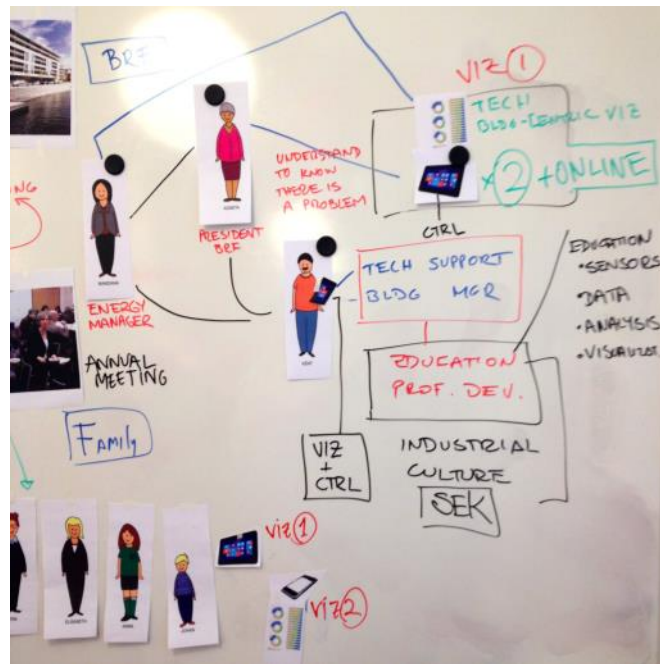


Figure 3. Creation of user stories during one of the workshops.

When the project partners had agreed on a few interesting stories we took them to citizen representatives in each test bed, such as energy managers from housing cooperatives. The energy managers have a high impact on decisions related to collective energy use, while they at the same time are citizens of the test bed. With the energy managers' input we could further adapt the stories to the local needs, limitations and interests.

Hackathons

Even though hackathons are not usually considered a service design method we use it in CIVIS in order to get fresh ideas from outside the project team. The first hackathon, CIVIS Green Campus Hackathon, was organized at Aalto University campus in May 2014 with approximately 60 students participating. The aim was to create ICT applications and services utilizing energy data collected from campus buildings and social media data. During the two-day event the participating teams built a variety of ICT tools that could be used in the campus. The teams tackled everyday energy consumption issues related to living, working and studying in the campus area.

One team built a Tetris-like game for campus people to learn how to recycle waste in the campus area: which piece of trash belongs to which trashcan? Another rewarded team build a playful social media tool for sharing everyday activities linked with information about the user's energy efficiency level. In the tool the users gradually build their own energy efficiency profiles and can compare that to other users or groups of users. For example, different teams in office buildings in the campus area could compete with each other.

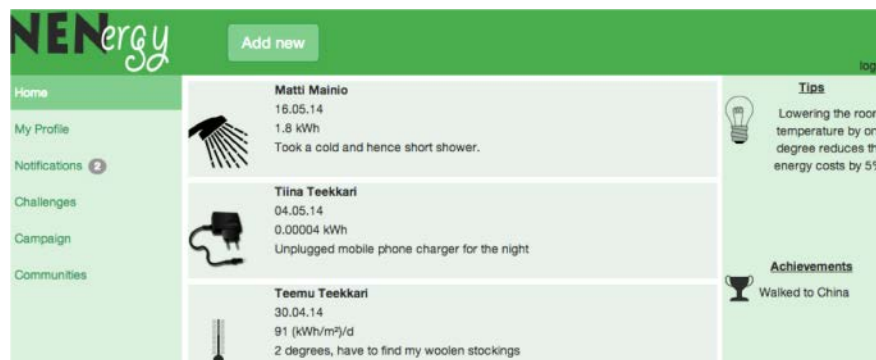


Figure 4. Screenshot of the social energy tool that was built during the hackathon.

For the future hackathons we will give the participants access to household energy data similar to what we expect to have access to in the test beds, and focus on solutions based on that data.

Table 1. Service design methods in CIVIS.

METHOD NAME	DESCRIPTION	WHY IT WAS USED	POSITIVE ABOUT THE METHOD	NEGATIVE ABOUT THE METHOD	WHEN IT IS BEST TO USE
Stakeholder mapping	Stakeholders drawing a personal map that connects people, tools, places and organizations and describes how they co-create value and what obstacles they might have in their own value network.	To get an overview on different stakeholders and their role in the ecosystem	Provides a quick overview on what kinds of roles, activities and possible obstacles stakeholders might have in the ecosystem.	Without following interview the interpretation might suffer.	In the beginning of the sustainable project when learning to know different stakeholders.
Storytelling group with internal experts	Multidisciplinary, internal project team creating narrative use scenarios and participating in discussion on local energy consumption practices.	In order to set up sustainable project goals and having common language to discuss about them	Everybody can participate and contribute to use scenario creation and discussion from their own perspective.	The outcomes could be more visually documented for efficient communication.	With internal experts in the very beginning of the project.
User stories	Narratives including fictional characters using the technologies and services that may be distributed or developed later in the project.	For discussions with internal as well as external stakeholders on what should be implemented in the project.	Concretizes project goals and their effect on the users, and facilitates adaptation to the local context and culture.	It requires substantial effort of all partners to read all revisions of the stories and provide feedback.	In the first stages of the project while defining the project goals and requirements. Reference in later stages, e.g. at hackathons.
Hackathon	Multidisciplinary teams of potential end-users design and build ICT tools to be used by their community. Best solutions are rewarded.	To get fresh ideas for sustainable ICT tools outside CIVIS project team.	Nice and fun ICT solutions were built that were very suitable for Aalto campus life.	The participants did not look beyond current technologies such as producing energy with solar panels in the campus but concentrated on technologies currently used in the area.	To quickly get implemented some ICT tools tackling local everyday life challenges regarding energy consumption.

2.1.3 Intermediary results in CIVIS

After the storytelling groups and many revisions of the user stories the project partners believed that the vision as well as individual research interests were reflected in the user stories. The stories turned out to be an important tool in concretizing the vision and in clarifying that social aspects can be both a means to sustainability (e.g. saving energy together or being motivated to behave more sustainably because of peer pressure) as well as a sustainable goal in itself (e.g. donate the savings from reduced energy use or increased local production to a socially good cause). Involving all partners in the design process also helped in creating a common understanding of the important particularities and differences of the Italian and Swedish test beds, which is crucial for everyone to properly adapt the project activities.

When creating and discussing the stories together with the project partners it became obvious that there were many things that we did not know about the test beds and that we needed to involve local stakeholders. Hence, by involving the project team in the story creation process we got the mandate to also involve citizens.

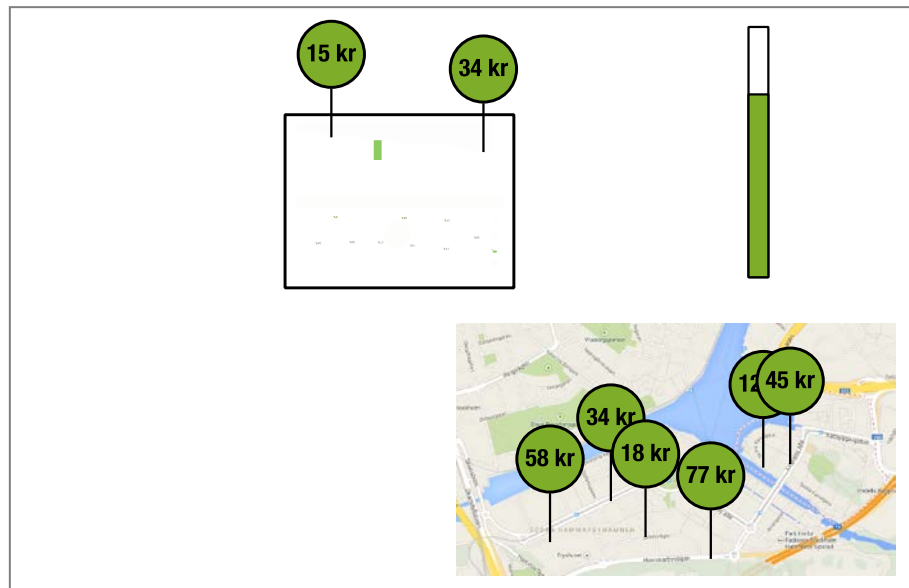


Figure 5. Illustration of a user story where collective saving efforts contribute to a social goal.

CIVIS is now moving towards a stage where more data and software (energy and social platform APIs) are available for hackathons to create innovative service concepts. As shown in Figure 1, we are using the hackathons also to improve on the CIVIS platform software, not just to produce innovative services for end-users.

2.2 SPIRE

The aim of our second case, SPIRE (2013-2014), is to create a flexible smart parking and guidance system that enables: 1) car users to find parking space and their way to a final destination with less time and energy spent and 2) parking operators, including real-estate owners, to manage parking spaces efficiently and intelligently. The technical core of SPIRE for collecting information is an event based software architecture linking data from different sensors and other sources.

In the project we looked into novel approaches that not only improve car users' parking and navigation experiences but also help car users reconsider taking the car by suggesting alternative travel modes. This required a very different approach from only supporting the user goal of "how to find a free parking space".

Although the SPIRE project involves a business model for parking operators and real-estate companies, in this paper we will share the process and methods that we used for designing SPIRE mobile app service concept.

2.2.1 SPIRE design process

The SPIRE project process rested on the double diamond design process (British Design Council, 2014) with four iterative steps of discover, define, develop and deliver, each step embracing various design methods.

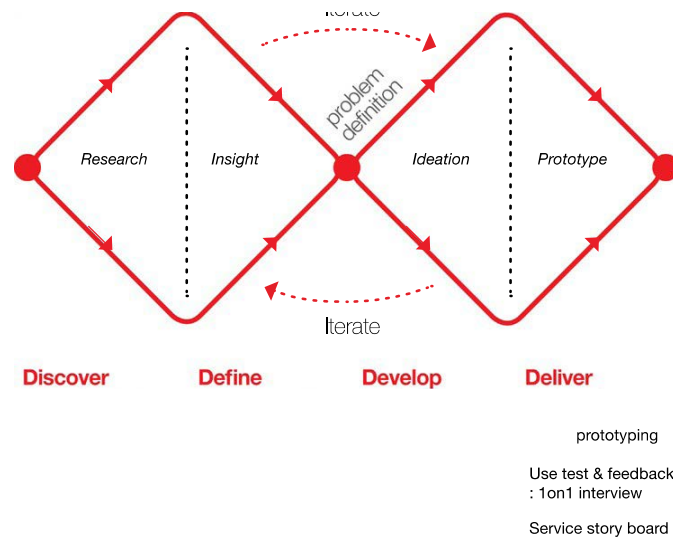


Figure 6. SPIRE design process and used methods (adapted from British Design Council, 2014).

In the beginning, we focused on gaining a clear understanding of the contexts and people around parking and guidance information service. We conducted field observations, street interviews and a co-creation workshop with potential end-users. A benchmarking research trip to Korea was executed to study services and technologies that were similar to ours and to see how they performed in the market.

After the discovery phase we sorted, clustered and organized the collected data to find user needs and market opportunities. Many graphic visuals were created to share the data within the team and we were able to find insights and patterns that repeatedly emerged from the visual analysis.

The insights and ideas were developed further into concept ideas by adopting user-centred, empathic and holistic thinking. We focused on synthesizing insights by exploring the relationships and connections of stakeholders, contexts, and our service concept.

Before developing the SPIRE app service concept for a smartphone we created a paper prototype for user tests and feedback. Feasibility, usability, desirability, pleasurability and utility of the app were tested with potential end-users. It was useful to verify the main features of the concept and refine them.

The SPIRE app service concept is currently in the process of being prototyped as a mobile app version. When it is ready it needs to be tested in a real physical environment with end-users, because we believe that implementation is not the end of the service design but the beginning of a new step that requires co-creative and multidisciplinary approaches for long-term use of the service.

2.2.2 Service design methods in SPIRE

User journey map and idea generation

In the early stage of the SPIRE project, a co-creation workshop with 16 potential end-users was facilitated in Aalto University Otaniemi Campus. The aim of the workshop was firstly, to explore various experiences and identify critical touch points in users' travel journeys especially by car as their transportation mode, secondly, to find out what users expect and need when they interact with a service and lastly, to brainstorm ideas that could bring behaviour changes of car users. For these purposes the workshop had two sessions; user journey map creation and idea generation of a service.

In the first session in order to find out how users' travel experiences and behaviours were different when they knew their destinations well and they did not, each group created two travel journey maps, routinized one and un-routinized one. For example, for un-routinized journey, each participant in a group discussed their own experiences of visiting a conference or a meeting place for the first time. Especially they needed to specify how their experiences were like in the order of 'before – arriving – arrived - after' visiting their destination.

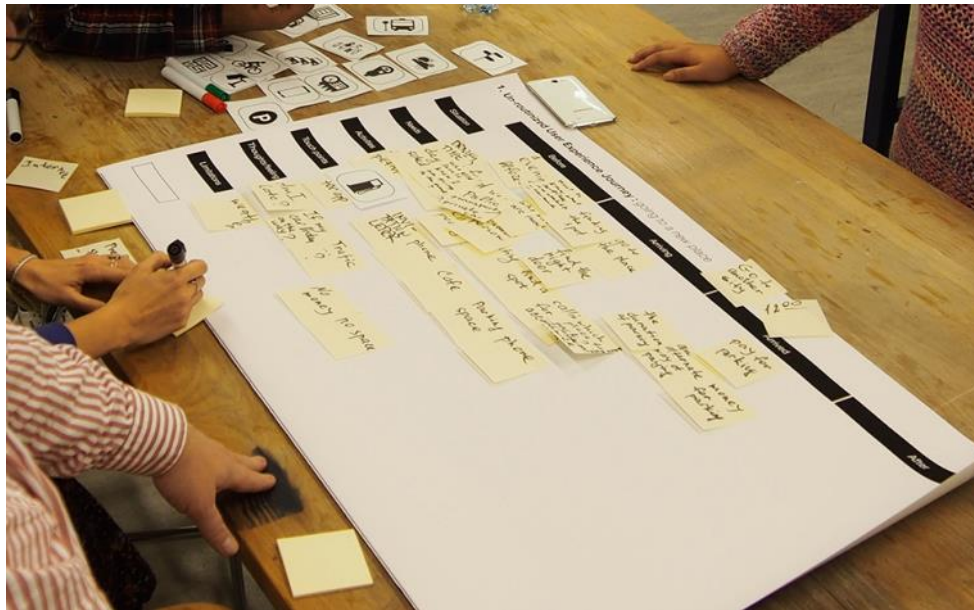


Figure 7. Workshop participants creating a user journey map.

In the second session, each group started to think about how to improve their current experiences and situations through a service, and drew or wrote ideas, needs and expectations on the created journey maps. The groups also had to think of ideas that can change the behaviours of car users. For the last part of the workshop each group presented their outcome, which led to more dynamic discussions and many new insights.

The co-creation workshop with potential users was a great chance to look into drivers' experiences, problems and challenges that they were facing during the whole journey. More importantly, it was clear that a routinized journey usually was accompanied by habitual behaviours of a user, but an un-routinized journey required the user's efforts from planning to finishing the journey. The overall results gave an opportunity for the SPIRE team to consider a service from the bigger social context with more dynamic users and stakeholders.

Persona creation and role-playing ideation

The SPIRE project involved many different types of potential stakeholders, but because of lack of time it was difficult to have interviews with all of them to explore their needs or challenges. For this reason, it was decided to look into concepts from the stakeholders' point of view through persona creation and role-play ideation. First, all the stakeholders around a service area were listed and then categorized into three groups: service receiver, service provider and authority. The service receiver group included everyday car users, sporadic car users and public transportation users coming to Aalto University campus either as everyday workers, students or visitors. Service providers included real-estate managers, parking operators and HSL (Helsinki public transportation service). The authority group included parking authorities, city planners and traffic planners.

Based on the stakeholder groups the team created fictional profiles of each stakeholder with background details such name, age, occupation and living status. For example, Kate, a 53-year-old woman, works in Nokia research centre (at Aalto University Otaniemi campus) as a senior researcher, lives in Espoo, commutes by car everyday and goes abroad often for work. Each team member was assigned 15 minutes to generate concept ideas from the perspective of a selected role that reflected the contextual intricacies of the stakeholder (e.g. "If I were Kate, I would like to book parking spaces for my visitors at work and invite them through an mobile app so that they don't have to worry about parking spaces."). The team then clustered the ideas and scored them while having discussions. The method promoted user-centred thinking and discussions on empathy among the team and enriched the quality and quantity of concept ideas.



Figure 8. Ideas based on persona creation and role-playing.

Service ecology map

In order to have the holistic view of the ecosystem of a potential parking and guidance app service, a service ecology map was developed. The map was designed in six zones of who, what, when, why, where and how with three levels of stakeholder groups around a potential parking and guidance app service.

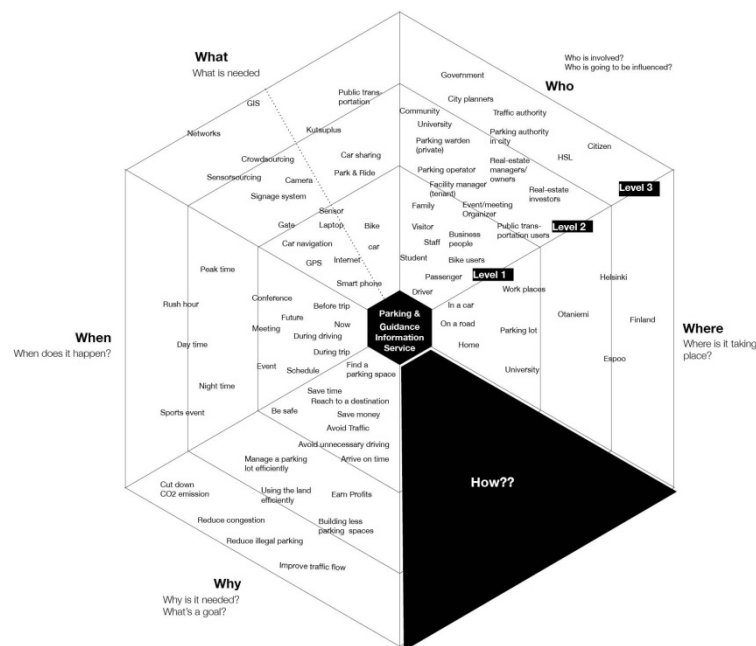


Figure 9. The service ecology map of SPIRE.

The development of the service ecology map not only helped investigate relationships of stakeholders and the service in a bigger context, but also helped make connections between different elements or services that normally would have been overlooked. As an example, park and ride service located between level 1, an automobile and level 2, public transportation could be one of the services reaching both needs of governments and car users, however, it is difficult for the first time users to utilize it without having information. So, the proposal was to include the parking and ride service information in the service concept so that the car users had more access to convenient public transportations with financial incentives.

The service ecology map was useful for the team because it presented the scope of the project by visualizing a series of levels that enabled the project team to focus in and out on the essential relationships of the service. By analysing the

service ecology map it was also possible to reveal opportunities for new actors to join the system and new relationships among the stakeholders.

Service concept scenarios

After narrowing down the SPIRE app service concepts, concept scenarios were created to share and refine the key elements of the service concepts with the team. There were two concepts proposed, and the main features of each concept were explained through potential user group scenarios having a series of situations in one's travel journey.

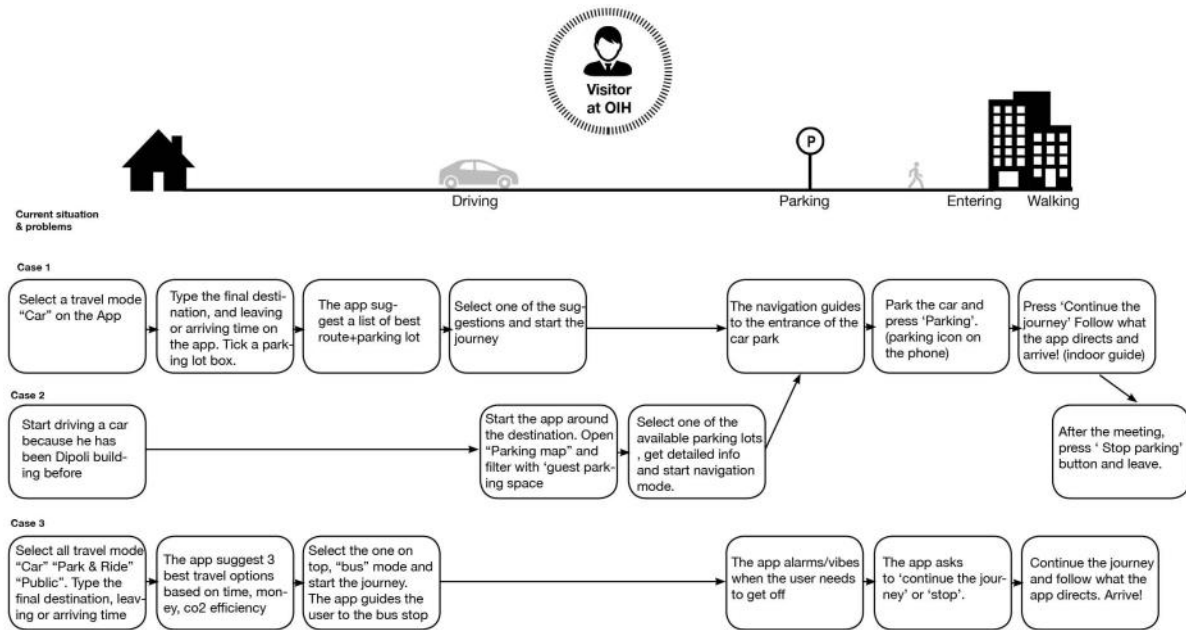


Figure 10. Service concept scenario for finding car parking or choosing alternative transportation.

For example, one of the main features was that users needed to share parking space availability information with other users through the app when they arrived to a parking lot in Aalto University Otaniemi campus while using the app for free. The scenario described the whole process of using the information and sharing it with others through the app. Seeing each concept through scenarios helped the team communicate the essence of the concepts, identify hurdles and prototypes for future refinement.

Paper prototyping and user test

Before making an actual mobile app prototype of the SPIRE service concept, a paper prototype was created for a user test and feedback session. The paper prototype was designed as almost the same size of a smartphone, visualized the main functions of the service. Five regular car commuters to Aalto University Otaniemi campus and five visitors coming either by car or public transportation to the campus participated in the test. The test was conducted through one-on-one interviews in a research room. In the beginning, basic questions such as age, gender, everyday transportation modes and some information of their smartphone use were given to support validation of the test outcome. While going through the paper prototype, the participants explained whether the features and process were clear, the visuals were intuitive, and the functions were useful or not.



Figure 11. Paper prototypes used in the tests.

The results of the test were very useful for the team to reconsider some of the features and user interface design of the app. For example, many participants did not understand the meaning of the green-yellow gradation on the parking map (see Figure 12) while the team strongly assumed that people would understand it intuitively.

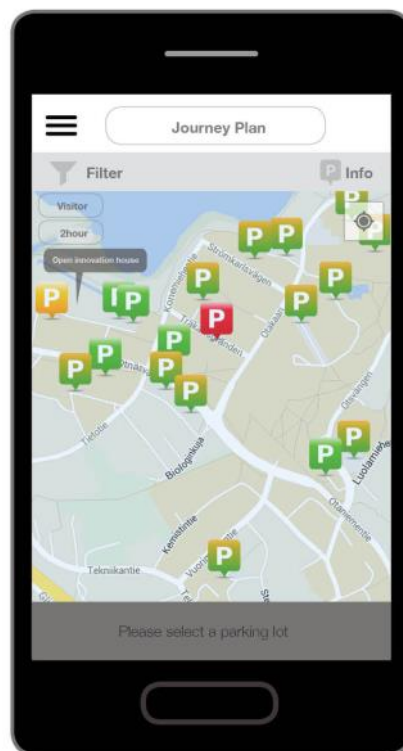


Figure 12. The meaning of the green-yellow parking symbols turned out to be difficult to understand.

Table 2. Service design methods in SPIRE.

METHOD NAME	DESCRIPTION	WHY IT WAS USED	POSITIVE ABOUT THE METHOD	NEGATIVE ABOUT THE METHOD	WHEN IT IS BEST TO USE
User journey map & idea generation	A Group of potential users create journey maps from their own experiences. After that, the users draw and write their expectations on a service generally and specifically based on created journey maps.	To explore user experiences and identify critical touch points in the user's travel journey. Also to find out what users expect and need when they interact with a service, and to brainstorm ideas together.	Everyone can participate in creating journey maps while sharing their own experiences. Shared experiences are easy to become a trigger of more dynamic discussions, which can reveal unknown needs.	More tools are needed for idea generation in order to support users thinking.	To understand users' various experiences and to gain insights from their needs and expectations in the early stage of the project.
Persona creation & role-play ideation (internally)	A project team creates personas, which are fictional profiles of stakeholders. Then, the team starts role-playing as if they are one of the stakeholders, which is one of the ways to brainstorm concepts that can take the team members out of their usual mindsets and assumptions.	To promote user-centred thinking and discussions on empathy, since the focus is on generating concept ideas that are of potential value to key stakeholders.	It enriches the quality and quantity of ideas and generates useful discussions among a team.	Team members should be more actively involved in role-playing.	To define and engage the different interest groups within and around a service. To think and generate concepts from another person's point of view.
Service ecology map	After collecting information about the key stakeholders and contexts around a service, a service designer maps collected data according to who, why, what, when, where and how, and get a holistic perspective of where a service exists and how it interacts with others.	To get a systemic view of the service and its contexts, which helps a service designer explore new opportunities and ideas, and establish the overall service concept by recognizing relationships around the service.	It can enable service designers to think beyond their ideas and see how the ideas fit into the wider context of people's lives and society.	It might be difficult to narrow down the focus area if boundaries are not set in the beginning.	In the early stage of the project, to get an overview of a complex system of a service and how the key stakeholders can work together in the wide context. To consider the sustainability of a service.

METHOD NAME	DESCRIPTION	WHY IT WAS USED	POSITIVE ABOUT THE METHOD	NEGATIVE ABOUT THE METHOD	WHEN IT IS BEST TO USE
Service concept scenarios	Visualizing and describing real-life scenarios as a series of situations that express how service concepts will be used by potential users in a certain context.	To explain key elements of service concepts, and to refine and develop concepts.	Seeing a concept as a scenario helps a team identify problems easily and support good communication and conversations.	There could be too many situations and scenarios generated even with one concept because of potential users and various contexts.	To facilitate storytelling and refine ideas. Also to support communications within a team.
Paper prototyping & user test	Before marking a real mobile app prototype of service concept, embodying a service concept in a paper version of mobile app. Then, going through the paper prototype with potential users through one-on-one interviews.	To get feedback of the overall service concept and specific functions. To test the basic usability of the app.	Results of user test and feedback are very valuable to develop a concept further.	User test and feedback session takes time because it should be done individually. Taking a test in a real environment (context) might bring more dynamic results.	To verify a concept or function together with end users, and to get unexpected feedback.

2.3.3 Results of SPIRE app service concept

The SPIRE app service concept supports two target groups with its functions. They are a staff group commuting to Aalto Otaniemi campus by car and a visitor group visiting the campus with different types of transportation modes. A staff group experiences routinized travel journeys that involves strong habits but less efforts while a visitor group experiences un-routinized travel journeys that involves strong efforts but less habit. For example, if a person goes to work everyday, they take the same transportation mode like a car, driving route, parking lot and even an entrance door at work. However, if a person has a meeting at a place they never visited before, it is useful to select the travel mode that ensures being there on time, no matter what travel mode habits one has.

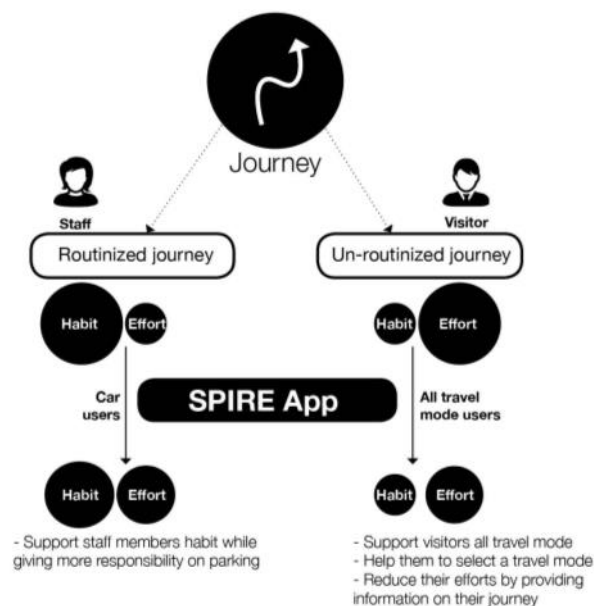


Figure 13. Differences between routinized and un-routinized journeys.

The SPIRE app service concept has different approaches for these two groups. For a visitor group, the app helps plan one's travel journeys from a starting point to an ending point with transportation mode selection, navigations and indoor

guidance service. The app compares selected travel modes by showing time, price, and carbon emission so that users can choose their travel modes based on their preferences. Especially the app includes available parking spaces close to one's final destination if a user selects 'a car' as travel mode. If there is no parking space available, one can easily select other travel modes through the app.



Figure 14. Interface for choosing travel mode.

For the staff group, the SPIRE app exposes them to opportunities to use public transportation by utilizing their car use habit. For example, by sending them a notice message through the app saying their usual parking lot at the campus is going to be full, they can either reconsider their travel modes or go to other parking lots a bit further from the work. Also, suggesting reconsideration of car use can be done through a campaign message. As long as the campaign has a meaning to the users, it seems that they are more willing to participate in rethinking their travel modes.



Figure 15. Favourites and notifications for the staff user group (left and middle) and a campaign message (right).

3 Conclusion

Sustainability is a complex issue, both when assessing existing practices and especially when creating possible future processes and practices such as within service design. Such “unknown sustainability” that is being designed presents important challenges to the project participants. Within our two cases we found that classic user-centred and co-design

methods that we employed are well fit for sustainable service design as in their case sustainability becomes one of the complex issues that the participants (from within or from outside the project) need to focus on. When such complex issues are properly introduced through examples and other concrete representations, stakeholders will start to engage with their complexity and take them into account in the creative process.

Since our two cases are very different, with a wide design brief in CIVIS and a much narrower project specification in SPIRE, the processes and selection of methods could not be the same. In CIVIS we first needed to work internally with agreeing on a project vision while in SPIRE we could start straight away with observations and end-user collaboration. Also the sustainability challenges in the two projects are rather unlike, but what the projects do have in common is the importance of outlining the “unknown sustainability” for each of the cases.

Concretizing the “unknown sustainability” perspective in the early stages of technology-oriented service design projects is needed in order to 1) focus the work of the internal project teams on the right issues and 2) finding a common language to talk about sustainability within a certain technological framework both internally and with end-users and other stakeholders. Based on our experiences from our two cases we summarise below our main learning points on how service design methods can facilitate this work.

We believe that service design methods can support good communication and discussions within a project team as well as with external stakeholders. It is because service design methods usually include maps, graphs, visuals or narratives that describe the complexity of contexts, stakeholders, systems or services. With a tangible output the methods can also support the team in finding *missing* aspects, such as in the case of CIVIS where the project vision (strongly focused on sustainability) was at first not properly incorporated in the user stories and not well understood by all partners.

In multicultural teams it is important to establish a good understanding of the place of the intervention and the people living there in order to be able to focus the work on the right issues. By involving internal stakeholders in applying the service design tools we all practiced thinking from the citizens’ perspectives and learned more about the test beds. It also became obvious that there were many things we did not know, and that we needed work closer with the local stakeholders.

While collaborating with stakeholders, internal or external, it is important to have an attitude of “listening openly”. As facilitators we should let the stakeholders or research participants guide the discussion towards what is important to them and our job is to create an atmosphere that triggers creative thinking.

Meeting in person to carry out the methods is not always possible in a big project with partners are spread out over different countries. It can be hard to receive useful input when sending documents forth and back and in CIVIS we found short online sessions to be a good complement to the documents. During the session we could discover and sort out misunderstandings, and new questions and ideas were raised. This, together with the workshops and meetings where all partners gathered, greatly helped us in concretizing the project’s sustainability aspects.

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Employees and users as resource integrators in service innovation: a learning framework

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In order to exploit the emerging opportunities in the marketplace or in society, service organizations are increasingly interested in new innovation models and effective innovative practices. The involvement of users and stakeholders is an essential aspect in these models. This is also the basis of the service-dominant logic (SDL). This framework replaces the traditional producer-centric view with an actor-to-actor perspective and considers the integration of resources an essential activity in the co-creation of value. Even though SDL has apparent implications for theorizing about service innovation, managerially-oriented research in this area is at an early stage. Product- and producer-centric practices and in-house R&D are still the focus of innovation studies, and they also dominate innovation efforts in organizations. The particular interest of this paper concerns the integration of user-based and employee-driven perspectives in innovation. The two perspectives have until now developed separately, the latter having very few linkages to the SDL discussion. However, grassroots level employees are in a key position as receivers of user insights and as collaborators with users. We suggest a new integrated approach by analyzing the user-employee interaction in innovation both theoretically and in two empirical cases.

1 Introduction

Continuous change, which is based on intensifying global competition and quickening technological development, is a central characteristic in today's economies. It has made rapid learning, i.e. the adoption and creation of new knowledge, an essential ability in organizations. Innovation activities have come to the fore and our understanding about the successful ways of carrying out these activities has deepened and become more versatile. In order to make innovation more efficient and effective, two developments are particularly important: the opening and the democratizing of innovation. The former is a result from the insight that organizations do not possess all the valuable knowledge in-house, but the utilization of external sources is necessary (Chesbrough 2006, 2011). The latter highlights that innovations do not emerge from expert groups only, but also emanate from 'non-experts' in communities of practice (Lave and Wenger 1991). In these communities, people learn with others while engaging collectively in creative efforts (John-Steiner 2000). Both views emphasize users, i.e., citizens, communal members, or service customers, as active agents (von Hippel 2005).

The earlier view on innovation focused mainly on radical technological inventions. Without broadening this view, the majority of service innovations and other intangible innovations would have remained hidden (Miles 1993, Howells 2004). Service innovations are not usually radical breakthroughs, but incremental in nature. Recombination of pieces of existing knowledge is typical. However, these small improvements may gradually lead to radical changes; hence neglecting them would be a serious mistake (Jensen et al. 2007). The pioneers of service innovation theory have pointed out that the cognitive inputs behind the individual outcome may be widely applicable, although the visible change would be minor (Gallouj and Weinstein 1997, Preissl 2000). The point is to reconcile the top-down managerial activities with the grassroots level activities that also include 'management' in the form of resource integration. This paper focuses on the resource integration carried out by employees and users.

In recent years, service-dominant logic (SDL) has become one of the most influential approaches in service research (Vargo and Lusch 2004, 2008). It suggests the adoption of an actor-to-actor perspective, instead of the currently dominant provider-centric view, in the analysis of economic and social practices. In this sense, it is in line with the user-based views of innovation. However, the proponents of SDL have focused more on the general economic development and everyday business behavior than on innovation. Connecting SDL with the broad view of innovation is a tempting perspective, but also a very demanding task.

We take a step in this direction: we examine and integrate the approaches of user-driven and employee-driven innovation and apply SDL and its 'neighboring' theories – effectuation and bricolage – in this framework. Based on the close linkages between innovation and learning noted above, we supplement our analysis with learning theories, especially with the theory of expansive learning (Engeström 1987). We argue that the actual interaction between frontline employees and users is a unique learning opportunity that organizations should utilize more effectively in the development of novelties.

We have structured the paper as follows. We start by reviewing the present discussions of user-driven and employee-driven innovation. Thereafter we summarize those points of SDL, effectuation and bricolage, and the theory of expansive learning, that we will apply in the creation of an integrative view about the role of user-employee

collaboration in innovation. We demonstrate the suggested framework with two case studies and discuss the framework's contribution to the theory and managerial practice of service innovation.

Please note that this paper in a shortened version of book chapter that will be published in “A Guidebook to Service Innovation” (Chapter 9) edited by Renu Agarwal and Willem Selen (eds.) (In press ISBN 978-1-4471-6589-7, Springer).

1.1 Perspectives on user-driven and employee-driven innovation in services – A need for an integrated view

Employees' and users' involvement has been considered fundamental in service innovation literature. This is because an innovator needs to understand a variety of activities involved in value creation linked to a particular service (Fuglsang and Sundbo 2005, Sundbo and Gallouj 2000). In addition to analyzing the service providers' activities, the interactions in the user interface and the users' activities that are not visible for the organizations are important to understand (Grönroos 2012). Users and employees are key actors in innovation because they co-create value in intangible service processes and thus have best knowledge of them. The perspectives highlighting their role are discussed in more detail in the forthcoming book chapter mentioned above. Here, we summarize only the main points in order to further our argument.

The point that organizations do not create innovations alone was first highlighted during the 1970s (e.g., von Hippel 1976, 1978). Later on, a large body of literature has indicated the importance of users for innovations; here, we refer to these studies as *user-driven innovation* perspectives (hereafter UDI). *Employee-driven innovation* (hereafter EDI) refers to “the generation and implementation of ideas, products, and processes – including the everyday remaking of jobs and organizational practices – originating from interaction of employees, who are not assigned to this task” (Høyrup 2012 p. 8, see also Kesting and Ulhøi 2010).

The studies show the importance of users' and employees' involvement and describe practices through which UDI and EDI take place. While this knowledge is developing rapidly, we recognize two research gaps. Firstly, UDI and EDI theories have developed in isolation from each other, as the focus is either on user-driven or employee-driven innovation. Even though studies show that many innovations take place in the user interface, only a few empirical studies provide insights into how users and employees practically innovate *together*. Secondly, even though grassroots level activities are viewed as important, they are not necessarily recognized and supported with managerial models. Without managerial support they may never transfer into replicable solutions (Fuglsang 2010, Brandi and Hasse 2012). Particularly management models that would integrate UDI and EDI are still scarce (Hasu et al. 2011).

Next, we will suggest several promising concepts for addressing these gaps. First, service-dominant logic (SDL) can provide a sound theoretical background for conceptualizing users' and employees' interaction in service innovations. Second, the concepts of effectuation and bricolage address situations where changes happen in an experiential way; even in circumstances of resource constraints, entrepreneurial employees and users can find innovative solutions based on ‘whatever is at hand’ (Baker and Nelson 2005, Fuglsang 2011). This viewpoint is especially relevant in public services, which face demands for cost-cutting and structural renewal. Third, the theory of expansive learning provides understanding of the emergence and development of these processes and helps integrate perspectives.

1.2 Service-dominant logic applied in the innovation framework

During the last two decades, the focus on use value has gained ground in innovation theories (Normann and Ramirez 1998, von Hippel 2005). This viewpoint is particularly suitable in the service context, in which it is difficult to think about value as inherent in specific outputs. A strategy based on the pursuit of use value is tightly linked to the pursuit of innovations: redefining the users' problems and discovering hidden demand, and providing users (or together with users, i.e. coproduction of value) solutions which they can make use and benefit in their everyday life (e.g. make vital improvement, achieve important goal, acquire anticipated change, enhance wellbeing etc.). When innovations are examined as new values, it is not enough to pay attention to individual services, but broader solutions and systemic changes are often under the spotlight. In these, the re-arrangement of existing items may be the core of innovation (Kim and Mauborgne 1999, Normann and Ramirez 1998).

Value-based analysis has much in common with the broad view of innovation (Kline and Rosenberg 1986, Lundvall 1992). In recent years, similar thoughts have been presented within the framework of service-dominant logic (SDL). As a service marketing -based approach, SDL is not directly linked to innovation theories. On the other hand, it aims to change our traditional thinking even more profoundly than any other theory towards the appreciation of users as central economic and social actors. Next, we first summarize the core propositions of SDL and then analyze its implications from the viewpoint of innovation.

In addition to its own theoretical postulations, SDL has analyzed and integrated views that are dispersed in various scientific ‘schools’ and disciplines, and which are relevant in the development of non-linear, user- and actor-based understanding of innovation. SDL-related approaches that are particularly useful are *effectuation* and *bricolage*. Next, we discuss the similar views of these two approaches on behaviors related to innovation in uncertain, resource-constrained environments. These notions can be used as a ‘bridge’ between SDL and innovation theories – regarding the theories on the management of innovation in particular.

Core propositions of SDL are presented in more detail in the forthcoming book chapter mentioned above.

1.3 Effectuation and bricolage as frameworks to tackle the uncertainties in innovation

How do people take action in uncertain, resource-constrained environments in order to innovate? Prominent theoretical perspectives on entrepreneurial action, particularly effectuation (Sarasvathy 2008) and entrepreneurial bricolage (Baker and Nelson 2005), suggest that instead of selecting between means to achieve a predetermined goal, in these environments individual entrepreneurs may rely on already available resources in identifying and exploiting opportunities (Fisher 2012). Effectuation replaces predictive logic with a *means oriented approach*, which begins from available resources and allows the goals to emerge in the courses of action. In line with SDL, it highlights that any given resource can be made more or less valuable and capable of producing long-term advantages: thus, what participants do with resources matters. *Expanding cycles of resources* characterizes effectuation, including the process of partner acquisition. (Sarasvathy and Simon 2000, Sarasvathy 2008). In iterative processes of *adaptive trial and error*, participants try out strategies that enable direct control, co-creation, and transformation of situations towards positive outcomes. Quickly realized *small successes and failures* help avoid the risk that some action would put the entire effort in jeopardy. (Sarasvathy and Kotha 2001). For the present study, effectuation provides means to recognize and understand the often messy potential of service innovation processes in the making.

Bricolage gives us a view of the *grassroots problem-solving practices of participants*. It suggests that when faced with resource constraints, employees may find innovative solutions based on 'whatever is at hand' (Baker and Nelson 2005, cf. Lévi-Strauss 1967). The participants create and combine their scarce resources in a novel way in order to develop some useful and novel outcomes (Baker and Nelson 2005, Fuglsang and Sørensen 2011, Salunke et al. 2012). Bricolage is a process of co-shaping an emerging path: participants offer inputs to generate a virtuous learning circle. The boundaries blur between design and implementation, and between rulemaking and rule following (Garud and Karnøe 2003).

Effectuation and bricolage both emphasize the significance of *individuals' actions and control over resources* (Fisher 2012). In order to explore how 'ordinary' interaction between employees and users can lead to innovations, we chose to use the concept of bricolage in the empirical analysis. Bricolage serves as a bridging concept between inherently abstract notions of UDI, EDI and resource integration. While being a theoretical concept, it is also a mode of individual practice which can be observed empirically. Bricolage incorporates contributions and resources of all participants in a given situation. Personal experience of bricolage, signaling the motive/need of an individual or a group, and the benefit that bricolage provides for meeting that motive/need, is often required for resource integration to begin (Engeström 2001a, also Baker and Nelson 2005).

1.4 Development of value co-creation: the theory of expansive learning

Practice-based (Blackler 1995, Ellström 2010) and situated (Lave and Wenger 1991) views on learning are especially relevant in the context of service innovation. New knowledge created in innovation activities is not only incorporated in new products, processes and services, but also in organizational practices; it is internalized by the people involved in the activity (Lundvall 1992, also Ellström 2010). Due to the intangibility of services, opportunities for unique value constellations may emerge during everyday service delivery, and the actors involved may improvise on the spot by creating and testing new tactics for value creation (Gallouj and Weinstein 1997). Service ideas are developed and elaborated in action without detailed a priori planning and new opportunities are rapidly used to revise the goals and value offerings (Toivonen and Tuominen 2009, Toivonen 2010).

As discussed above, service dominant logic, effectuation and bricolage all open up new perspectives on the *significance of multiple relations and activities* in acquiring resources for value creation in service innovation. We also acknowledge that these views inherently approach the idea of learning, i.e. the development of communities and capabilities related to new value creation (e.g., John-Steiner 2000, Miettinen 2013). The idea of resources as 'becoming' (Vargo and Lusch 2004) suggests that *resources emerge in social action*. Correspondingly, the argument that what people do with resources matters (Read et al. 2009) proposes that *people's context-specific actions* related to resources are significant. These views imply that integrating or expanding resources for innovation require concrete 'making': creative and laborious process in which contexts, participants, and relations are constantly being reconfigured in order to create new value.

Why and how would participants make the effort to reach beyond their known resources and capabilities in order to collaborate creatively (John-Steiner 2000)? This question is the interest of inquiry in the theory of expansive learning (Engeström 1987) which derives from the cultural-historical activity theory (Cole and Engeström 1993, Leont'ev 1978) and which is also closely connected to practice-based, situated and cultural theorizing of learning.

Expansive learning in a community begins when, during the course of activity, some individuals begin to question the current goals, patterns and norms, sometimes even the basic motive/need of the activity, and search for new practices. In some cases, this escalates into collaborative envisioning and a deliberate collective change effort at grassroots level (Engeström 1999, 2001a, 2001b), after which a new motive and expansive cycle follows. Engeström (1987) proposed this as a new form of learning: *expansive learning* of cultural patterns of activity that are not yet there, and which therefore involves *horizontal or sideways* learning and development (Engeström 2001a, 2001b). Hence,

actions in situations that require innovative solutions often take the form of improvisation and bricolage (ibid.). Individuals' and groups' transformative agency is at the core of expansive learning: a firm cannot be the subject of expansion. Therefore, *expansive learning perspective offers theoretical and analytical means to explore, in a nuanced way, the emergence and development of resource integrator roles and practices in service innovation.*

1.5 Integration of resources as a new perspective in innovation management

We suggest an integrative framework in order to better understand and enhance users' and employees' interaction, especially the integration of resources for co-creation of use value in service innovations. We apply ideas from three sources discussed above: service dominant logic (Vargo and Lusch 2004, 2008), effectuation and bricolage (Read et al. 2009, Garud and Karnøe 2003), and expansive learning (Engeström 1987). Together these theories tackle the following interrelated processes:

- (1) Practice-based emergence of motive, relations and capabilities related to resource integration and configuration (this involves opportunity recognition by experimenting with resources for tackling the unknown, i.e. what is not yet there).
- (2) Integration and configuration of resources from multiple actors (this relates to the actor-to-actor -perspective, the expansive use of resources comprising of users, employees, and other parties, and the ensuing creation of new resources).
- (3) Adoption or transformation of integrated resources for sustaining and diffusing/re-innovating the use value (effectuation through expanding cycles of resources).

The three interrelated processes can be seen as a dynamic development process or a temporal trajectory of resource integration and configuration. Expansive learning takes place – or needs to take place – across all these processes, but especially in the second and third processes. Shifts between processes are critical for the expansion to continue, as it does not necessarily proceed smoothly (Hasu 2000a, 2000b, Hasu and Engeström 2000). Figure 1 presents the focus of the present study and the linkages to its three theoretical backgrounds, hereafter formulated as *the learning framework of resource integration*.

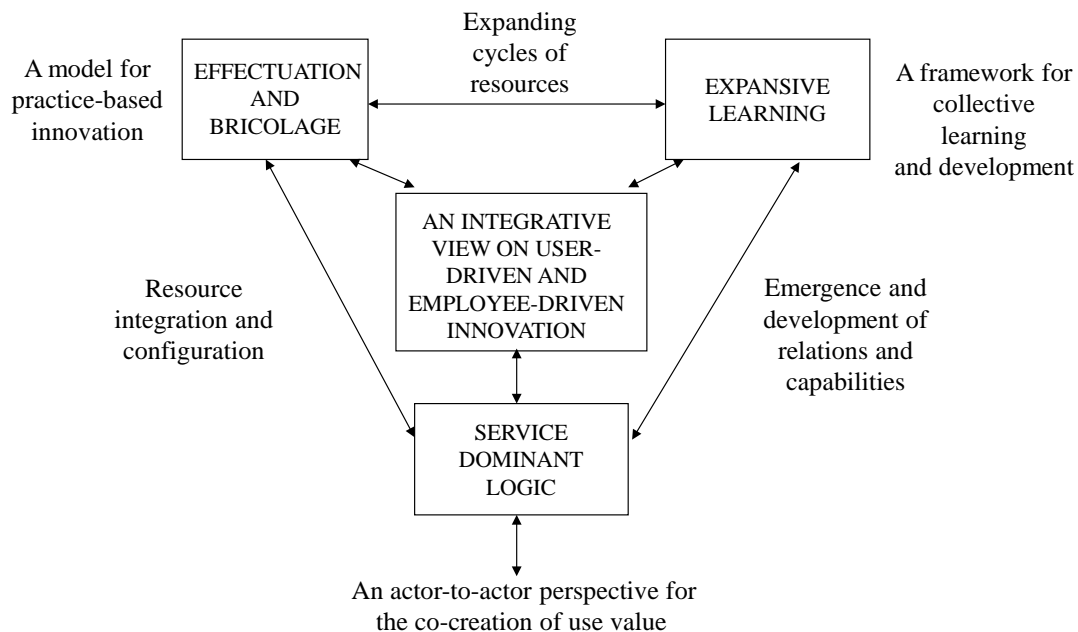


Figure 1. The focus of the study and the linkages to its three theoretical backgrounds: learning framework for resource integration in service innovation.

2 Learning-based resource integration in practice: Two case examples

We provide two in-depth case studies from the Finnish public sector to illustrate the developmental dynamics of the resource-integrator roles of employees and users in a resource-constrained environment. We apply the framework developed above and highlight these groups as 'practical bricoleurs'. Both case studies, *Elderly day club* and *Forest pre-school*, come from a middle-sized city in the southern part of Finland. Next, we present the analytical challenge, the data and the methodology used. After that we summarize our results as three phases of resource integration. In order to explore the role of resources of employees and users in micro level interactions, we apply the learning framework for resource integration developed above. The framework provides the analytical means to make visible the emergence of

various cultural resources and the expansion of these resources from one mode of activity or one participant group to another.

2.1 Data and the case study methodology

The data collected from 2011 to 2013 included thematic interviews of 4 informants involved with the Open day club for elderly and 8 informants involved with the Forest pre-school, each lasting approximately 1,5 hours. In addition, few on the spot interviews of managers, employees and users were conducted during participant observation. Interview themes covered the interviewees' perceptions concerning their prevailing – current and future – intentions, roles, practical tasks/duties, benefits and ideas related to the novelty under scrutiny. The interviews also included narratives about everyday life at the sites. All the interviews were recorded and transcribed. Field notes and reports were written during and after the observations. Also documents, such as planning documents, brochures, journal articles, webpages and a book, were collected from both cases.

Our case study included both the temporal and the social-material point of view of expansion, i.e. what actions had been taken in particular point of time, and what material and social resources had been used at that time (methodology of analyzing expansion, see Hasu 2005, 2000a). Among the *potential dimensions of expansion* (Engeström 2001a, Hasu 2000a), the *social-spatial* ('who else should be included?') dimension refers to the inclusion of employees, users and potential other parties as resource integrators in service innovation. It characterizes the interactional practice in the context in which resource integration takes place and new relationships are built up in order to create, sustain and spread a novelty. Accordingly, we aimed at examining and interpreting the temporal development of value co-creation in resource integration activities as social-spatial expansion. Our analysis was conducted in three phases. First, the development trajectories of both cases were written into rich narratives bearing the resource integration (of all the actors involved) in focus. Then, the trajectories were divided into three phases of expansion and finally, the elements in social-spatial expansion in each phase were investigated and considered in detail.

Please note that the following presentation of results is a shortened version from the forthcoming book chapter.

2.2 Results: development of resource integrator roles and the co-creation of use value in two cases

We identified three phases of resource integration and related roles in the two cases:

1. Origin and emergence of the resource integrator capabilities of employees (employee bricoleur)
2. Emergence of collaborative resource integration of employees and users (the most critical phase of expansion in the resource integration)
3. Transformation of resource integrator roles of employees and users

The findings suggest that the second phase is critical especially from the viewpoint of employee-user interaction. It opens up an insight into the previous and preceding phases of resource integration accordingly. Next, we will first describe both cases by briefly introducing the overall context, and then concentrating on the second phase of the resource integration.

Elderly day club: Emergence of collaborative resource integration of employee and elderly

This case describes a municipal service which provides the elderly with an opportunity for social interaction and stimulating social activities. The aim was to promote the physical, social and mental well-being of the elderly who were living on their own. The case illustrates how an employee, working as a facilitator of the elderly day club, together with the users, creatively integrated available human and material resources (her own and those of the users) in order to develop novel activities. The facilitator actively sought new resources by developing collaboration with volunteers and other groups. As an outcome, the elderly day club covered a much wider range of social activities than originally budgeted for.

In the first phase of resource integration, the responsible employee had learned how to gather and nurture scarce material resources to test her service ideas. However, a new service idea, carpentry workshop, was the outcome of collaborative resource integration. The engaged employee convinced the local manager that separate, dedicated groups were needed for men and women in order to keep men participating in the club. She made an application with an action plan, got a few rooms and acquired some funds and donations; when the workshop project started, she was the motor of the project.

Critical expansion in this second phase marked the emergence of collaborative roles of the employee and elderly users as resource gatherers and integrators. Because of scarce resources and without former experience of woodwork, the responsible employee asked the future users, i.e. the elderly men, to help finish the carpentry workshop facility. She 'hand-picked' a small group of recently retired men and collaborated with them intensively in gathering donations, materials and equipment from their personal and former occupational networks. The men were eager to help. Instead of being the sole bricoleur, the responsible employee and the elderly users became co-bricoleurs.

New activities, abilities and energy emerged in the participant groups. This resulted into rich production of crafts, which were then sold outside to get new funds for materials and trips. For instance, men renovated old furniture and donated them to the campus. The men's group sustained: more men came in and stayed. The most inspired participants recognized the unique potential of the service and volunteered to spread the activity. The responsible employee felt empowered as she succeeded and learned new competences.

The carpentry workshop project proved successful, and as the word spread, also the upper management recognized the work and praised it in public. Ideas of the elderly were heard and appreciated in the planning of the activities. In the third phase of resource integration, however, a major transition started in the organizing of many services for elderly, and the management's target shifted to systematization of all services instead of developing single services. The roles of the responsible employee and the elderly in the local campus changed: the employee was given a new assignment as a general coordinator of the elderly day activities in the city, and the elderly users adopted the role of facilitators of their own activities.

Forest pre-school: Emergence of collaborative resource integration of employees, managers, children and parents

This case study illustrates how a pedagogical novelty called Forest Pre-School evolved from a local service improvement in a children's day care center into a forest pedagogy concept covering the entire town. The first experiment was created by employees, and nurtured by several training occasions, contacts with foreign forest pedagogy researchers, and the forest surrounding the day care center. During a period of scarce financial support, resources and knowledge were actively sought from the parents of the children. However, spreading the local service improvement required help from the service director. The expansion of resources and ideas from the employee-bricoleur to the service director, and the resulting collaboration between them, served as a springboard for the wider diffusion and sustainability of the novelty.

In the first phase of resource integration, a nature-enthusiast local manager had encouraged her employees to integrate nature in their educational practices. She had asked one outdoor-hobbyist employee to plan how nature could be integrated to the early childhood education and even solve the shortage of facilities. The outcome of the ensuing broader collaborative resource integration was the forest preschool - with a hut in the woods - as a local attraction. Two employees made a plan, actively participated in the start-up, and solved many practical problems while organizing the educational activities outdoors. In the early phase, the group stayed only a few hours a day in the forest but later on they started to spend there more time to fully benefit from the idea. In spite of many practical problems, the employees persistently developed the nature-related educational activities outdoors, and stayed outdoors even during the winter.

Critical expansion in the second phase was the emergence of collaboration between employees, parents and children as resource gatherers and integrators. The children kept a diary on their nature observations, which formed a basis for learning and documentation of the novelty. The parents were welcomed to join right from the beginning and their occupational competences served as a resource in enriching the education. Especially fathers became enthusiastic collaborators: some of them joined winter-fishing trips and loaned their fishing equipment to children. Employees, parents and children became co-bricoleurs.

Pre-schoolers became active observers, explorers and bricoleurs of their surroundings. One of the two responsible employees became known as an expert of forest pedagogy, and started to write a book about the endeavor and to give lectures for early childhood educators. The other responsible employee became a skillful photographer of the nature and the pre-school activities. Fathers in particular became involved with early childhood education in a new way, and the residential area became attractive for families.

The local manager and upper management (a service director) reacted quickly to the needs of the forest pre-school group: for instance, a milk trolley was acquired in order to serve lunch outdoors. The local manager often acted as a partner in problem solving and bricolage. In the third phase of resource integration, one responsible employee, the local manager and the service director joined forces and started to spread Forest pre-school as a service concept in the municipality. All parties broadened their competences, but the capabilities and responsibilities of the individual employee expanded the most as she became an active agent in diffusing the substance of the novelty.

Summary of the two cases in the critical phase of resource integration

The cases have similar characteristics, but they also differ in some respects. The cases illustrate, first, that the ability for expansive resource integration between employees and users was actually rooted in the *preceding experiences of small successes and failures* (Sarasvathy and Kotha 2001) and *relations in the wider network contexts*, in which the motivated employees had learned to replace missing or incomplete resources with other available sources (e.g., Vargo and Lusch 2004, 2011). The employees had become bricoleurs, equipped with a work pattern of dynamic resource utilization and confidence on self-determining and creative problem solving.

Second, employees' *ability to recognize users' experiences, networks and competences* as meaningful resources was an important prerequisite for successful collaboration. Users were respected as co-bricoleurs, i.e. hands-on partners in service development. Inspired by a challenging opportunity, employees and users together collected and nurtured partial resources and combined them in a novel way. Through this laborious activity they built control over the idea and resources (Fisher 2012) that were meaningful and available for them. The service opportunity was materialized in new

facilities and equipment, and manifested in new supportive and rewarding relations (social-spatial expansion). Both employees and users learnt new capabilities and agency as they co-created new value.

The case examples also reveal the challenges in creating service innovations through bricolage: *the work methods were not replicable as such, as they depended on creative combinations of unique resources in the local context*. However, the features and principles of forest education were generalized, or as they themselves call it, productized (cf. Valminen and Toivonen 2011). This was not yet the case in the Elderly day club, as the managers were reconsidering the role of the service.

Third, the cases show that these combinations may involve different sets of actors and the lack of some actors' involvement can be replaced by others'. Here, the cases differed in some respect. In the Elderly day club, resource-integration became a shared capability between a single employee and the elderly users, while in the Forest pre-school, collaborative agency emerged within a larger community, which included employees, managers, children and their parents. In the Elderly day club, discovering the capabilities and social support of the elderly at least partially replaced the management's support. Constant managerial support was not critical, implying that learning and agency of elderly users as producers of their own services was strengthened. When the role of the employee later changed into that of general coordinator, the elderly partially replaced her as the facilitator at the site. In the Forest pre-school, on the other hand, the employees could not rely solely on children's own willpower. The broader community comprising parents and managers had to be mobilized for nurturing the novelty, which also strengthened the resource utilization from the very beginning. In spite of scarce and partial resources available in the two cases, both succeeded in expanding the novelty.

3 Summary and concluding discussion

The motive of our study derived from the observation that even though the resource integration perspective in the co-creation of value is increasingly discussed in the context of service innovation, producer-centric and R&D-based practices still dominate both innovation studies and practical innovation efforts. Although interest in 'lay knowledge' in service innovation has increased, research on grassroots users' and employees' practical activities and, in particular, their interaction in resource integration, has not attracted much research interest. In this paper we analyzed the user-employee interaction as a source of innovation both theoretically and on the basis of empirical cases. We aimed to contribute to this research gap and suggested *a new integrated approach* via combining several theoretical frameworks, namely, user-driven innovation, employee-driven innovation, SDL, effectuation and bricolage, and expansive learning.

We demonstrated the benefits of this framework in empirical analysis: it enabled exploring resource integration as a practical, dynamic activity which is sensitive to practice-based interaction and learning between users, employees and other potential stakeholders. Our study showed that grassroots-level collaboration between employees and users was critical in the development of the novelty.

This approach provides several contributions. First, the framework established a connection between *user-driven and employee-driven views of innovation*, both of which can be placed at the center of open and democratic innovation debates addressing widened participation and 'lay knowledge' in innovation from the point of view of resource integration. Second, the approach links *SDL with the theory of expansive learning*, which – supplemented with effectuation and bricolage – provides SDL with new analytical means to explore how, in micro-level practices, use value is co-created in dynamic processes of expansion. The integrated view therefore represents the *learning framework of resource integration*. Third, we applied SDL to study innovation in the *public sector* which is also a new contribution in the SDL field.

The framework also suggests theoretical and managerial implications. First, it has implications for the research and management of *service innovation processes*. Earlier research addressing co-creation have either focused on planned activities or on practices at the organizational level (Kowalkowski et al. 2012, Mele et al. 2010, Salunke et al. 2013). Our study implicated, on the contrary, the *significance of improvisational practice-based activities*. Effectuation and bricolage provide useful analytical perspectives for studying these activities. From a managerial point of view, effectuation and bricolage can be considered as alternatives for linear, predetermined managerial processes (Fisher 2012). Our cases indicate that these bottom-up managerial patterns do emerge also in the public sector, where renewals are traditionally initiated by policy or structural changes and managed top-down. The bottom-up practices enable the emergence of novelties by providing the employees not only with a frame for service but also with control over resources and freedom to use creativity. The *combination of frame, freedom and control of resources* supports the employees and users to utilize opportunities perceived.

Second, implications address fostering of *service innovation culture*. Our study suggests analytical and methodological means to understand the *nuances of practical contexts, actions and roles* in the emergence of new services. Recognizing the dynamics of resource integrator roles requires sensitivity from managers. Service employees and users do not necessarily recognize the innovative potential of their practices. In addition, they typically lack the time, motivation or capability to conceptualize their novelty in order to be able to transfer it from one context to another. A successful resource integrator needs to be able to expand his/her role and related interactions (e.g., Wrzesniewski and Dutton 2001). An essential managerial capability is that of being able to *identify the role of both employees and users in service processes*, and of sensitively *guiding the dynamics* of the resource-integrator roles.

Third, the implications of the research on *diffusion of service innovation* include the *view of resource integration as developmental process* in which collective, practice-based learning is critical. Prerequisites for the diffusion of the

novelty do not just exist there to be discovered by an outside party, but they are rooted in the preceding cycles of expansion: experiences of small successes and failures and relations in the contexts (e.g., Sarasvathy and Kotha 2001). A theoretical perspective able to analyze development is needed. From the managerial point of view, our study suggests *that the replication of novel solutions is a separate learning challenge which is often unrecognized, and consequently left unmanaged*. It requires that a broader group of actors learn from the novel value-creation processes. Managers may initiate these collective learning processes, if they are able to recognize the significance of a solution, and provide resources and support for subsequent developmental activities. Another option is to create a collaborative service culture in which service employees within and between organizations actively share novel solutions, and in this way gradually develop the services. Thus, although novel solutions often emerge at the customer interface, *a single employee cannot leverage the solutions without managerial support*.

Our study also suggests a few new directions for *further research* which we were not able to cover in detail, but which are connected to the implications discussed above. The current views on service productivity highlight that it is not enough to focus on efficiency of resource utilization, but the interactive process between the provider and the user and the impacts on the use value (effectiveness), have to be taken into account (Grönroos and Ojasalo 2004). The suggested theoretical framework contributes to this interactive view of creation of use value in service innovation. Further research will be needed to explore how the proposed learning framework of resource integration can be applied to study service productivity and quality.

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Factors Influencing Organizational Purchasing of Knowledge Intensive Business Services

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Business organizations often purchase knowledge-intensive services from outside rather than making them in-house. However, not much is known about the reasons that influence the business customer's decisions to purchase knowledge intensive services. Thus, the purpose of this study is to explore factors that influence organizational purchasing of knowledge intensive business services. A qualitative case study is applied to gain multi-dimensional understanding of the phenomenon. Findings indicate that customers want a trustworthy long-term partner, which facilitates superior value creation through their knowledge intensive services. Service providers need to be alert for changes that happen in customer's spheres, and proactively match with those changes.

1 Introduction

In the business-to-business context, customer organizations often acquire knowledge intensive services from other organizations specialized in particular fields (Toivonen, 2008 Matthyssens and Vandenbempt, 2008; Kowalkowski et al., 2011). These services include management consultancy, legal assistance, computer and information related services, accounting and auditing, specialized training, advertising, and R&D services, just to name a few (Miles, 2005). These knowledge intensive service activities play crucial roles in developing and progressing the businesses of their customer organizations further (Bettencourt et al., 2002).

Often customer organizations already possess the necessary expertise and capabilities, or can develop them within a reasonable timeframe, to produce these service activities inside the organization. Some organizations actually choose to do so, whereas others prefer to source them from outside. These make-versus-buy decisions carry many important implications for both the customer and the service provider, including the focus and development of core competencies, organizational structure, necessary resources and capabilities, formation of business relationships, and revenue and profit functions (Valk and Rozemeijer, 2009; Fitzsimmons et al., 1998). However, extant literatures do not provide clear understandings on why some customers outsource knowledge intensive services and others refrain from doing so. In order to gain greater understanding on the dynamics and mechanisms of business-to-business markets, it is both academically and managerially important to explore and analyze the factors that lead firms to outsource knowledge intensive business services.

Previous researches have focused on various dimensions of organizational outsourcing and purchasing, including general conceptual developments (eg. Smeltzer and Ogden, 2002; Fitzsimmons et al., 1998; Webster and Wind, 1972; Sheth, 1973), factors that affect an individual's influence in organizational purchasing decisions (c.f., Kholi, 1989), length of time requires to make major purchase decisions (eg. Dholakia et al., 1993), effect of word-of-mouth on buyer's behavior (File et al., 1994), decision criteria and relationships (eg. Eriksson and Vaghult, 2000; Sonmez and Moorhouse, 2010; Lian and Laing, 2007), and use of information technology (eg. Ellram, 2002). Nevertheless, much of the existing literature on organizational purchasing focus on acquisition of tangible physical resources, and the knowledge is not always applicable to understand the purchasing of services from KIBS (Valk and Rozemeijer, 2009). Hence, not much is known about the factors that influence the business customer's decisions to purchase external knowledge intensive inputs to conduct business activities. Also, the issue of knowledge intensive business services has seldom been studied empirically. We aim to fill-up some of these knowledge gaps through this study. Therefore, *the purpose of this study is to explore the factors that influence the business customers to purchase knowledge intensive business services rather than creating the same themselves.*

By addressing the above mentioned purpose, this study provides improved insights into the factors that influence business customer's "make or buy" decisions regarding knowledge intensive services, and thereby extends theoretical knowledge regarding organizational outsourcing of business services. The factors have been examined in the context of modular engineering services, and thus allow generating context-specific knowledge. This study also carries practical implications. The customer organizations may find the study helpful to take more informed decisions on purchasing knowledge intensive inputs from other organizations, whereas the service providers can gain practical insights on the key factors that lead business customers to purchase their services.

This study is exploratory in nature. Therefore, it requires an approach that allows extending prevailing theoretical knowledge, and thus closing the gaps in existing literature to some extent. Accordingly, the study approached the phenomenon with an open frame, drawing on range of theoretical arguments to explore and analyze the factors influencing purchasing of knowledge intensive business service (c.f., Coviello and Joseph, 2012). 26 narrative interviews have been conducted to gather empirical data including both the customer and the provider perspective. Primary data collected through the interviews have been supplemented also with secondary data.

In the following sections of this study, a succinct review of existing literature on features of knowledge intensive business services as well as features of organizational purchasing is presented, followed by the description of the methodology of this study. The subsequent section presents the findings of this study. The last section includes further discussions in relation to the findings, the potential theoretical and managerial implications, and the limitations of this study.

2 Theoretical framework

In this study, we have used several streams of literature to understand the phenomenon under question, including conceptualization and development of knowledge intensive business services, and organizational purchasing. Below, we provide a short and concise review of the existing knowledge on these topics. However, bearing in mind that each of these topics are considered as distinctive research streams in their own right, we do not intend to provide any literature review with a broader scope, but limit our focus only on the relevant literatures.

2.1 Knowledge intensive business services – concept, development and characteristics

Knowledge intensive business services (KIBS) are service organizations whose primary value propositions include knowledge intensive inputs to the business process of customer organizations (Miles 2005, 39). The service offerings, or the service activities provided by these organizations, are complex in nature, are based on professional knowledge, and are mainly performed by people with formal and specialized training and education.

As suggested by Hertog (2000, 505), KIBS firms depend profoundly on professional knowledge, i.e., knowledge or expertise related to a specific (technical) discipline or functional-domain. The term was first used by European Commission the NACE classification (an European Commission classification of economic activities) to denote a specific set of service activities. KIBS have an increasing role of in our society, since they are growing fast, owing to changes in other sectors demanding knowledge inputs to deal with changing technologies and social conditions (Miles 2005). In spite of that research concerning KIBS is quite scarce compared to research concerning manufacturing organizations (Muller & Doloreux 2009).

The distinctive characteristics of KIBS are in the knowledge intensity of their value propositions or core offerings. Based on knowledge intensity, three principal features of KIBS can be identified: (a) their profound dependence on professional knowledge, (b) they either are themselves primary sources of information and knowledge or they use knowledge to (co) create value propositions or core offerings to support their clients' value creation processes, and (c) they are of competitive importance and serve primarily to other businesses (Miles et al., 1995). Knowledge intensive business services often need to be customized to meet the particular needs of business customers (Bettencourt et al., 2002), which is possible by the means of modularity. Also, by nature KIBS tend to be more technical compared to consumer services due to the greater complexity of organizational needs of the customer. This suggests that the factors that lead business customers to purchase KIBS offerings may differ depending on the services being purchased (Fitzsimmons et al., 1998).

2.2 Purchasing of knowledge intensive business services

The issue of organizational purchasing has been addressed mainly by three stream of research, namely economics, purchasing, and to some extent, marketing. Irrespective of the research stream, the literature normally emphasize on variables related to the task of purchasing itself, and has mainly focused on the "rational", economic factors. In addition, research on organizational purchasing focuses on issues such as emotions, personal goals, and internal politics (Drumwright, 1994). The purchases are influenced by budget, cost, strategy, and profit considerations, and involves multiple personnel in the decision making process with complex interactions among people and among individual and organizational level goals (Webster Jr. and Wind, 1972).

Academic research on purchasing of knowledge intensive business services seems narrow in comparison with purchasing to tangible items, including raw materials and finished products (Valk and Rozemeijer, 2009; Sheth, 1996). The unique characteristics of knowledge intensive business services influence multiple aspects of the purchasing process, as certain dimensions become more important or difficult compared to purchasing goods (Axelsson and Wynstra, 2002; Smeltzer and Ogden, 2002). In comparison to purchasing goods where the customer organization can create specific criteria and requirements, agreements concerning knowledge intensive business services are relatively ambiguous between customers and service providers. The quality of tangible goods is often pre-specified and measurable by the customers, whereas the measurement of service quality is subjective and user-dependent. Similar kind of differences can be identified in cost, pricing, delivery and payment between goods and services (Sonmez and Moorhouse, 2010).

Purchasing knowledge intensive services often requires considerable amount of information on various aspect of the service offerings, the service provider, potential risks, costs and benefits, and strategic options (Lau et al., 2003). Generally, organization purchasing is more risky than that of the consumer due to the high degree of cost involved and the potential effect on a larger group of people (Sonmez and Moorhouse, 2010). In addition, purchasing of knowledge intensive business services comprise even higher risks compared to basic and generic services due to the credence

qualities and costs involved (Mitchell et al., 2003). When compared with purchasing products, the main difference arise from expectations; quality; predictability of demand, cost, verification of contract completion, and payment (Sonmez and Moorhouse, 2010). Often in the case of knowledge intensive services offerings, it is difficult for organizational buyers to analyze value outcomes of the potential service activity in advance, or even after the purchase (Valk and Rozemeijer, 2009). In other words, it is difficult to determine the value-in-use of the offering beforehand, or evaluate the same objectively afterwards. When compared with purchasing goods, the main difference arise from expectations; quality; predictability of demand, cost, verification of contract completion, and payment (Sonmez and Moorhouse, 2010). In addition, business customers may need to provide input at several stages of the creation and purchasing processes of services, and hence they play multiple roles throughout the process, namely that of the co-designer, co-developer, co-producer, co-implementer and co-marketer of services (Aarikka-Stenroos and Jaakkola, 2012). The prospect of multi-role playing may increase the complexity of the purchasing process of knowledge intensive business services even further (Valk and Rozemeijer, 2009).

3 Methodology

This study is exploratory in nature. Therefore, it requires an approach that allows extending prevailing theoretical knowledge, and thus closing the gaps in existing literature to some extent. The study approached the phenomenon with an open frame (c.f., Coviello and Joseph, 2012), drawing on range of theoretical arguments to explore and analyze the factors influencing purchasing of knowledge intensive business services.

3.1 The Empirical Setting

The empirical setting for this study consists of one knowledge intensive service provider and four of its customer organizations. The service provider delivers modular engineering and consulting services. The customers are engaged in metal and chemical industries, water supply and security and support businesses. These customer organizations employ the knowledge intensive business services from this specific service provider for various purposes, including planning, implementation and supervision. This specific research setting has been selected due to the fact that the offerings of modular engineering services are highly knowledge intensive in nature, and therefore provide an in-depth understanding of the factors influencing the purchasing of knowledge intensive business services.

The service provider, referred to herein as ABC Engineering, is a large global service provider of modular engineering and consulting services, operating mainly on project basis. The first customer organization of ABC Engineering, referred herein as Steel, is a large global manufacturer of stainless steel. The second customer organization, referred herein as Chemi, is a large global chemical company serving customers in water-intensive industries. The third customer organization, referred herein as Water Pur, is an SME that provides water supply and the waste water drainage and cleaning. The fourth customer organization, referred herein as Secur, is an SME that provides a wide range of security and other support services. The name of the case company and its customers as well as all the interviewees were agreed to remain confidential. The research process of this study can be divided into two distinctive but interconnected and overlapping phases: data collection, and data analysis and interpretation.

3.2 Data Collection

The empirical data has been collected based on the five projects between the service provider and their customers, where the service provider has supplied crucial knowledge-intensive inputs. The main source of data collection has been face-to-face narrative interviews. Data has been collected from both the customer's and the provider's side with the expectation that it will provide complementary information about the total scenario, and also help in data triangulation (c.f. Aarikka-Stenroos and Jaakkola, 2012). In total, 26 interviews have been conducted over a period of 3 months. The interviews included 16 representatives from the solution provider, and 10 representatives from the customer companies. Table 1 in the next page shows further information regarding the interviewees and the respective interviews.

Table 1. Details of the Interviews.

Organization	Function	Firm Size	Interviewee	Date and Time	Duration	Place
ABC Engineering	Service provider	Large	Head of northern Finland	11.2.2013	57 min	Oulu, ABC Engineering
			Structural engineer	18.4.2013	60 min	
			Project manager	29.3.2013	73 min	
			Head of department	18.4.2013	53 min	
			Structural engineer	18.4.2013	58 min	
			Head of department	3.5.2013	40 min	
			Group manager	10.5.2013	47 min	
			Group manager	27.3.2013	56 min	
			Head of department	13.3.2013	83 min	
			Water facility engineer	18.3.2013	63 min	
			Water facility engineer	18.3.2013	65 min	
			Design manager	5.3.2013	60 min	
			Structural engineer	6.3.2013	64 min	
			Design manager	11.2.2013	50 min	
			Group manager	13.2.2013	48 min	
			Water facility engineer	16.3.2013	57 min	
Steel	Customer	Large	Foreman of ore line technicians	13.5.2013	36 min	Oulu, VTT
			Head of mining department	13.5.2013	39 min	
Chemi	Customer	Large	Oulu site manager	13.3.2013	61 min	Oulu, Chemi
			Professional buyer	13.3.2013	52 min	
			Manager	13.3.2013	80 min	
Water Pur	Customer	SME	Head of municipal establishment	16.4.2013	45 min	Oulu, Water Pur
			Structural engineer			
			Manager of design team	19.4.2013	62 min	
Secur	Customer	SME		18.3.2013	37 min	Oulu, VTT
			CEO	24.4.2013	103 min	
			Network manager		(joint interview)	

The interviews have been conducted based on open-ended questions and discussion themes, which provided several advantages: (1) not to limit the interviewee responses with predefined choices, (2) uncover the various factors leading to the purchasing of knowledge intensive business services not mentioned in the existing literature, (3) to raise matters that were not specifically queried. Thus, narrative interviews provided the formality to analyze complex phenomena, and enabled the emergence of unexpected issues. Each interview has been recorded with the consent of the interviewee using a digital data recorder.

3.3 Data Analysis

To start analysis of the empirical data, the recorded interviews have been transcribed first, resulting in 241 pages of written scripts. The empirical data was analyzed with classifying various recurring patterns in order to identify the variables that influence the purchasing decision of knowledge intensive business services, while also allowing new themes to emerge from the data. The analysis started by reading each transcript carefully to in order to obtain a first impression. Thereafter, each transcript was compared with the other transcripts.

Next, data which have been collected through secondary sources, for example, company brochures, meetings minutes and workshop details, have been compared with the preliminary findings. Some dissimilarity was identified there, which have been sorted out through cross-checking and cross-matching. In case of any confusion, the respective person from the companies has been contacted to ratify the issue. In the next section, the key findings of this study are described.

4 Factors influencing the purchasing of knowledge intensive business services

We have identified six different factors that may influence the business customer's decision to purchase knowledge intensive business services from other organizations. One individual factor, or a combination of multiple factors, can affect the purchasing decisions.

4.1 Potential to Create Superior Value

The empirical data shows that business customers are interested to realize superior value in line with their business operations and strategies. Customers' perception of the probability of realizing additional value affects the purchasing decision positively. As it is reflected by one of the interviewees from a customer organization:

"The value proposition should be what we think is worth paying for --- if they get ten euros from us, we should get savings of twenty euros from something else." (Manager, Chemi)

If the customer's own analyses demonstrate that compared to developing in-house, outsourcing the knowledge intensive business services will generate greater value-in-use, they are more inclined to purchase the service offering from a service provider.

4.2 Individual Preferences

Organizational purchasing often involves multiple personnel in the purchasing process, and there are also complex interactions involved between people. The empirical data indicates that at a more micro level, certain actors play more crucial roles compared to the others. These people often hold the positions of power inside the organization, and their individual choices and preferences influence the purchasing decisions regarding the knowledge intensive business services. Also, it is possible that due to organizational systems and bureaucracies, certain purchasing decisions are made by specific personnel, whose options carry more importance than others. One interviewee from a customer organization indicated:

"When it comes to big enough amounts of euros, we talk to sourcing manager, who is located in Sweden. --- Purchases over 30 euros go to the sourcing manager. It will be discussed with the sourcing manager, whether to make the purchase or not." (Professional buyer, Chemi)

4.3 Perception of Quality

In knowledge intensive business services, it is not possible for the customers to evaluate the quality before purchasing the services. Therefore, customer's perception of the quality of the service is another important determinant of the purchasing decision. The Head of department, ABC Engineering emphasized:

"First, they check company references and they check personal references. --- Company does not do the work, it is the personnel who does it. If the personnel, that has references, has changed, it makes selling the project much more difficult."

The customer's perception of service quality is formed and shaped by multiple factors, including past experiences, the provider's reputation, and referrals from peer groups.

4.4 Geographic Proximity

The location of the service provider, and their spatial distance with the customer, can influence the purchasing decision. In case of higher distances, the customers often consider that service providers located in other cities or countries cannot serve them properly, as challenges may arise due to the distances in problem identification, service formulation, and appropriate implementation. As the CEO of Water Supp comments:

"We chose the service provider because of the location is within a reasonable distance from here."

Too long physical distances also hinder two important aspects of services: face-to-face interactions and after sales support. In situations like this, the customer often decides to develop the services internally rather than outsourcing the same.

4.5 Availability of Information

The empirical data suggests that purchasing knowledge intensive business services requires considerable amount of information on various aspect of the service offerings, the service provider, the potential risks, costs and benefits, and the strategic options (c.f. Lau et al., 2003). Empirical data show that if sufficient information regarding the service provider and their offerings are available which allow the customer to make relatively objective and informed decisions, the probability to outsource the solution becomes higher. Statement made by a professional buyer from "Chemi" supports this finding:

"If we need to buy something, we need to have really specific information. Technical people will gather sufficient information and then we use them to get an offer and then our internal people will possibly negotiate with the supplier."

4.6 Risk Perception

It became evident from the empirical data that organizational purchasing is considered rather risky venture especially due to the intangible nature of the offerings, the high costs involved, and the strategic importance of developing and implementing the service offering. The customer is more likely to source the service offering from outside if the risks are minimal in relation to the possible benefits. The service offering can also carry the potential of creating competitive advantage for the customer organization in the long run. Hence, the customer might decide to own the proprietary rights of the service, which will create barrier for their competitors to acquire very similar types of service, and thereby protect their competitive advantage.

4.7 Flexibility

The service provider offered modular engineering and consulting services to its customers. This means the service offerings of the provider are divided into smaller modules rather than a coherent whole, and different modules can be selected and united into various combinations to serve the specific needs of the customers. This modular nature of the service offerings made it flexible compared to the legacy knowledge-based service offerings, and increased the probability to serve the customers according to their requirements. This, in turn, enabled the customers to create the right kind of value-in-use. As the empirical data shows, for the customer organization, these kinds of flexibilities which meet dissimilar conditions are very much difficult to develop in-house, especially if they do not fit with the customer's core business. Hence, business customers tend to outsource the services from outside organizations.

5 Discussion

In order to gain greater understanding on the dynamics and mechanisms of business-to-business markets, it is central to explore and analyze the factors that lead firms to purchase knowledge intensive business services, which allow them to create and realize superior value. To achieve this, we have conducted a qualitative empirical study, which we expect to add to the existing understandings regarding the phenomenon and provide crucial context-specific knowledge.

According to our study, customers purchase inputs from knowledge intensive business services for six main reasons: potential to create superior value, individual preferences, perception of quality, geographic proximity, availability of information, and perception of lower risks. In case of purchasing knowledge intensive business services, the perception of service quality is strongly subjective. According to the findings, factors such as location of the service provider, neutrality, and the overall value proposition can play significant roles along with the price in making the purchase decision. Customers want a trustworthy long-term partner organization, the ones which may facilitate superior value creation through their knowledge intensive services. Findings indicate the importance of the service provider being on the same page with the customer, and delivering modular offerings supports the customer's value creation processes. In addition, it is crucial to be alert for changes that happen in customer's spheres, and act proactively to match with those changes. It became evident from the data that business customers are demanding and they might have urgent needs, which emphasize even more the important role of sensing opportunities and customer needs proactively.

5.1 Theoretical Implications

The importance of studying both organizational purchasing and knowledge intensive business services are supported in the existing literature. This paper may contribute to the literature through expanding the existing knowledge. From a theoretical perspective, this study provides improved insights on the factors that influence business customer's "make or buy" decisions regarding knowledge intensive services in the business-to-business markets. As the factors have been examined in the context of modular engineering services which have received relatively little empirical attention in marketing literature, it allows generating context-specific knowledge that contributes new knowledge to the current literature.

5.2 Managerial Implications

The study also carries crucial practical implications. The service providers may benefit from gaining practical insights on the factors that lead business customers to purchase their knowledge intensive services. In certain situations, the understandings can help to manipulate the factors in such manners that will generate favorable outcomes for the service provider. The increased understanding can also help to target marketing efforts to the right direction. The findings may also be useful to customer organizations to take more informed decisions on purchasing knowledge intensive inputs from other organizations.

5.3 Limitations and suggestions for future research

Although the study has been conducted in the context of engineering and consulting services, the factors that influence purchasing of knowledge intensive business services from external sources have been analyzed at a general level in this study, and suffer multiple weaknesses from these generalizations. It does not detail specific purchasing situations with

rich details to make the findings operational (c.f., Webster, Jr., and Wind, 1972). Also, the findings cannot be quantified at this stage without further developments. Nevertheless, the generalizations offer a reimbursing set of benefits.

The findings provide an overall perspective on organizational purchasing, which allows evaluating the importance of specific variables, leading to greater insights into the antecedents of organizational purchasing of knowledge intensive business services. Geographical boundaries imposed another limitation to this study. The empirical data have been collected only from Finland, thus making it harder to generalize the findings to other geographical contexts. Data collection only from engineering service providers and their customers also create similar challenges against generalizations to other services.

In our findings we discovered that there is need for future research concerning market sensing, which is very essential for anticipating opportunities and changes in the markets that influence purchasing decisions of business customers. Anticipating these changes proactively enables service providers to adjust their procedures, processes and offerings to correspond to those needs.

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Netnography in marketing research: A review and recommendations

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The purpose of this paper is to systematically review the use of netnography in marketing research and propose recommendations for use of the method in future marketing studies. A total of 193 articles published between the years 1997–2013 were systematically identified and collected. In a following filtering process, a final selection of 149 articles was chosen for further analysis. Our review reveals that marketing researchers increasingly use netnography in a variety of ways across different marketing research contexts and topics. We also see many future opportunities for netnography in, for example, service marketing and business-to-business research. The study outlines and discusses theoretical, empirical, and methodological issues and opportunities associated with netnographic marketing research.

1 Introduction

In recent years, the interest for the qualitative method of netnography has increased tremendously among marketing researchers. The Internet enables researchers to deepen the understanding of consumers' lives and experiences for example in online communities (Kozinets, 1998; Puri, 2007; Helkkula; Kelleher, 2010). Consumers are increasingly active online and the boundaries between the online and offline worlds are blurring, and online consumer behaviour is highly transparent and permanent. Netnography has been acknowledged within the field of marketing research as an important source of consumer information (Kozinets, 1999; Bickart; Schindler, 2001; Catterall; Maclaran, 2002) and it has become an important tool for understanding today's customers (Tikkanen et al., 2009; Simmons, 2008; Rokka, 2010). Netnography can be defined as a form of ethnography conducted online and it provides qualitative insights of consumers' symbolism, meanings, and consumption patterns (Kozinets, 2002). Compared to traditional ethnography or other qualitative methods, netnography is a relatively simple, inexpensive, and unobtrusive marketing research technique (Kozinets, 2010). Consequently, we expect the interest in netnography among marketing researchers to continue.

Netnography has been employed in the marketing literature in studies of a wide variety of topics, for example, brands (Schau et al., 2009), tourism experiences (Björk; Kauppinen-Räsänen, 2012), and e-WOM (Colliander; Hauge Wien, 2012). It has been used in different ways. For example, the role of the researcher differs between netnographic studies, from an active participant in the online community to a passive observer (Kozinets, 1997, 2001; Brown et al., 2003). Netnography has proven to be an especially useful approach to access and elicit data on, for example, sensitive topics (Langer; Beckman, 2005; Keeling et al., 2013). Because of its unobtrusive character, netnography offers the marketing researcher a view of customers' own realities (Giesler; Pohlmann, 2004).

Despite the recent increase in popularity of this methodology (Larsen, 2014; Pihl, 2014; Key et al., 2013; Richardson, 2013), no systematic review of studies utilizing netnography has been published. As a consequence, no overview or comprehensive summary of netnography studies within marketing exists, and this paper seeks to fill this gap. A systematic review of this type is needed to systematically analyse, integrate, and critique past netnographic marketing research, and by that, help future marketing researchers employing netnography. Therefore, the purpose of this paper is to systematically review the use of netnography in marketing research and propose guidelines for using the method in future studies. The paper addresses two research questions:

RQ1: In what research contexts has netnography been used?

RQ2: How has netnography been employed?

The study is based on an extensive synthesis of 149 articles employing netnography published over the last two decades. The review indicates how the use of netnography has increased since the first articles were published in the late 1990's. The paper contributes to the literature of marketing and netnography by providing a comprehensive overview and analysis of the use of netnography in marketing research. The findings reveal several gaps in existing research and suggest what and how future netnography studies could be focused upon. Managerial implications are related to how netnography could be used for gaining further insights about customers.

The remaining parts of this paper are structured as follows: First, the method of netnography is presented. Then, the methodology of the systematic review undertaken in this paper is outlined. The next section describes the findings from the systematic literature review, and finally, conclusions are drawn and discussed in the last section of the paper.

2 Netnography

Internet is nowadays an integral part of life in the developed world with a population usage rate of more than 90 percent in some European countries (internetworldstats.com). Consequently, consumers share more and more of their lives and

consumption experiences online, often through online communities organized around shared interests. Internet has thus opened up new avenues for marketing researchers to gain consumer insights (Kozinets, 1998, 1999; Catterall; Maclaran, 2002; Puri, 2007). As the number of Internet users continues to increase around the world and more of the social life moves online, marketing researchers have increasingly embraced the research methodology netnography.

Netnography was developed by Kozinets (1997) as a response to the increase in use of Internet by consumers to gather information and discuss consumption-related issues with fellow consumers. A reason for the drive to discuss and form consumer communities online is the assumption that fellow consumers provide better and more objective information than corporations (Kozinets, 2002). The netnography approach utilizes an ethnographic research method to study and understand consumers' lives online (Kozinets, 2002). The method "allows the researcher to gain access to consumer discussions by observing and/or participating in communications on publicly available online forums" (Nelson; Otnes, 2005, 90) in order "to identify and understand the needs and decision influences of relevant online consumer groups" (Kozinets, 2002, 62). As netnography is "based on primarily on the observation of textual discourse", qualitative content analysis or discourse analysis is often used to analyse data (Kozinets, 2002, 64). However, the difficulties of generalizing results to groups outside the studied online communities should be noted (Kozinets, 1998).

3 Methodology

As systematic review approach was chosen to map out the usage of netnography in marketing research. Originating from the medical sciences, systematic or evidence-based literature reviews have increasingly been adopted by business researchers in order to reduce bias and provide a comprehensive body of knowledge (Denyer and Tranfield, 2006; Bryman; Bell, 2011). A systematic review investigates the literature on a particular subject with explicit and transparent methods that follow a standard series of stages (Mulrow, 1994). As a consequence, systematic literature reviews are regarded as more objective, unbiased, and trustworthy than traditional narrative literature reviews (Egger et al., 2008).

The methodology of this review follows general guidelines for conducting systematic literature reviews in business research (Tähtinen; Halinen, 2002; Tranfield et al., 2003; Gremler, 2004; Helkkula, 2011). The main steps of this study was the following: (1) define search terms, (2) identify the databases and search engines, (3) decide and apply inclusion and exclusion criteria, and (4) repeat the filtering process to ensure a representative article selection.

The search for articles for this review was conducted during January and February 2014. In order to identify and gather all the marketing studies utilizing the netnography, we used the descriptors "netnography AND netnographic" in our literature search. The following databases were searched to identify relevant articles: ABI/Proquest, Business Source/EBSCO, Emerald, ScienceDirect/Elsevier, JSTOR, SAGE, Springer Link, and Wiley Online. These databases provide a large selection of peer-reviewed business journals and were thus considered appropriate for this study.

In a next step, criteria for inclusion and exclusion were established. The first criterion for an article to be included was that it had to be in the field of marketing. The second inclusion criterion was the existence of the term netnography or netnographic in the title, keywords, and/or article text. Conference papers, doctoral dissertations, business magazines, articles in other languages than English, and textbooks were excluded. As a result, 193 articles published between the years 1997-2013 were identified and collected. In the following filtering process, all the articles were carefully read through, and a final inclusion criterion was established: for an article to be included in the study it had to be an empirical marketing study fully or partly employing the netnography method. In this step, we sorted out seven conceptual articles and additional 37 studies that were not labelled as netnographies. The final selection of articles for further review resulted in 149 articles that we later analysed according to our research questions. Next, the findings of the analysis are presented and a synthesis of the literature provided.

4 Findings

The analysis of the 149 articles reveals a rapid growth in utilization of netnography by marketing researchers. As illustrated in Figure 1, it took approximately ten years from the first publication on netnography until the method became widespread. From 2008 and on, we can see a sudden increase of netnography publications in marketing journals. From available data, it clearly looks like netnography is establishing itself as a recognized qualitative methodology within marketing. Due to societal social media and Internet trends, we expect the increase in netnography to continue in the years ahead before we see a flattening in the curve of publications per year.

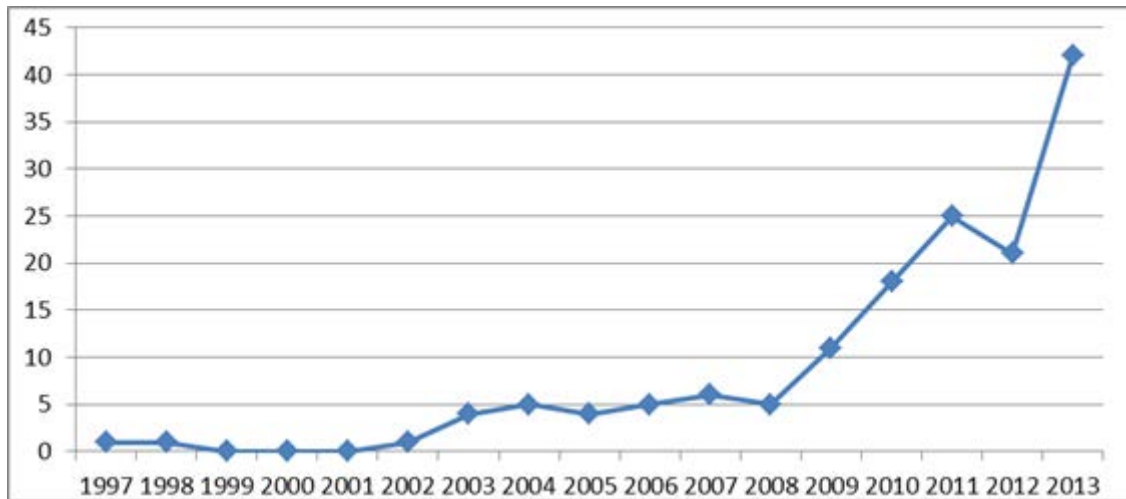


Figure 1. Growth in number of marketing studies using netnography 1997–2013.

Along with the growth in number of marketing studies using netnography since its birth 17 years ago (Kozinets, 1997), also the number of publication outlets for netnographic studies have increased. The journal *Advances in consumer research* was the first journal to publish a netnography (Kozinets, 1997) and is still the journal with most published netnographic studies. And among the top ten journals in terms of netnography publications, seven can be considered as consumer research journals. As can be seen from Table 1, a majority of netnography articles included in this review have been published in *Advances of Consumer Research*, *Journal of Marketing Management*, and *Journal of Business Research*. Also, the top ten journal accounts for over half of all netnography publications. More and more journals, however, publish netnographic studies and we can see from our analysis of the articles how the distribution of netnographies across marketing journals increases yearly.

Table 1. Top 10 journals publishing netnographic marketing studies.

<i>Journal</i>	<i>No. papers</i>	<i>Percent</i>
Advances in Consumer Research	15	10,1
Journal of Marketing Management	14	9,4
Journal of Business Research	13	8,7
Qualitative Market Research	8	5,4
Journal of Consumer Behaviour	7	4,7
Journal of Customer Behaviour	6	4,0
Consumption Markets & Culture	5	3,5
Research in Consumer Behavior	5	3,4
Journal of Consumer Research	5	3,4
International Journal of Consumer Studies	4	2,7
Other marketing journals	67	44,7
Total	149	100,0

4.1 In what research contexts have netnography been used?

A closer analysis of the 149 netnography articles included in this review reveals three marketing fields in particular that have adopted netnography. Approximately half of them are studies of consumer behaviour or consumer culture, whereas branding studies covers 22% and the tourism sector covers 15% of the netnography studies (see Table 2). The rest of the netnography studies represent 9% of the articles and are found in fashion marketing, healthcare service, and service marketing. Taken together, however, the general service sector (tourism, healthcare, and other services) represents approximately a fifth of the netnography articles in this review.

Table 2. Contexts and topics of netnographic marketing studies (n=149).

<i>Context</i>	<i>Topic</i>	<i>Exemplary studies</i>
Consumer research (54%)	Consumer culture, e-WOM, green consumption, anti-consumption, innovation, cross-cultural consumption	Kozinets, 1997; Hernandez; Vicdan, 2013; Walther; Sandlin, 2013; Kozinets; Handelman, 2004; Füller et al., 2007; Takhar et al., 2012
Branding (22%)	Online brand communities, value creation, brand relationships, retro-branding, brand defending, luxury brands	Schau et al., 2009; Brown et al., 2003; Koivisto; Mattila, 2012; Pongsakornrungrasit; Schroeder, 2011; Colliander; Wien, 2013
Tourism service (15%)	Food tourism, tourist experiences, tourist motivations	Mkono; Wilson, 2013; Podoshen, 2013; Hsu et al., 2013
Fashion marketing (5%)	Fashion blogs, online fashion communities,	Kulmala et al., 2013; Cervellon; Wernerfelt, 2012
Healthcare service (3%)	e-WOM, online health communities	Liang; Scammon, 2011; Keeling et al., 2013
Service marketing (1%)	S-D logic, service quality	Patterson; Brown, 2009; Yang; Fang, 2004

Netnography has been employed in the study of a variety of consumer research topics. For example, in his initial reflections, Kozinets (1998) presented netnography as a method for consumer research and emphasized its usefulness in the study of cybercultures and virtual communities. Since the introduction of netnography, consumers have increasingly become active in online communities and social media, and netnography has thus proved its usefulness and become a popular method among consumer researchers. As a variant of ethnography, netnography particularly shows advantages over other methods in the study of online cultures of consumer groups. Like face-to-face ethnography, it offers the researcher a window into the cultural (online) reality of a particular consumer group (Kozinets, 2006). For example, Giesler; Pohlmann (2003) used netnography to understand the consumption meanings and communal activities surrounding the file sharing system Napster.com. Through collection and analysis of cyber-interviews, emails, websites and entries on message boards, the authors conceptualized the file sharing system as a community based on a gifting culture. A more recent example of cultural understanding through netnography is Healy; Beverland's (2013) study of the Furry consumer culture. The exploration of Furry online communities helped the authors to explain the zoomorphism of "Furries" as a means of self-authentication.

Consumer researchers have also used netnography to understand all kinds of consumer behaviours online. Today, many consumer behaviours and activities are reflected online as well as offline. A typical example is word-of-mouth (WOM), which traditionally spread between family, friends, and colleagues, but with the Internet became a considerably more powerful phenomenon with the possibility to go viral (Dellarocas, 2003; De Bruyn; Lilien, 2008; Ferguson, 2008). A netnographic approach provides guidelines for researching online phenomena and several marketing researchers have employed netnography for the study of electronic WOM (e-WOM). Liang; Scammon (2011), for example, adopted netnography for their study of e-WOM on health social networking sites and revealed how more informed e-group members provided less-informed members with advice, guidance, and support. Buying behaviour is another traditional marketing topic which in its new online form has been researched through netnographic inquiry. From the netnography of e-procrastination by Negra et al. (2008), we learn that online purchase delay results from negative attitudes and experiences of online shopping, perceived risk and price, locus of control and purchase task complexity.

In addition to consumer research, netnography is a popular method for studying and understanding brand-related phenomena. Kozinets (1998) explains how netnography is a suitable method for the study of online or virtual communities. With the rise of online brand communities, netnography became a way for marketing researchers to understand different brand-related phenomena from the inside of these communities. In an ethnography of three brand communities (Ford Bronco, Macintosh, and Saab), Muniz; O'Guinn (2001) realized the importance of web sites for brand communities and the consumers' everyday life. Since then, much research has been conducted on brand communities online with the help of netnography. Examples include brand communities and co-creation (Cherif; Miled, 2013), brand communities embedded in social networks (Zaglia, 2013), rivalry within and between brand communities (Ewing et al. 2013), anti-brand communities (Hollenbeck; Zinkhan, 2010), counter-brand and alter-brand communities (Cova; White, 2010), brand communities and value creation (Schau et al., 2009), and brand communities in relation to brand meaning creation (Broderick, 2003). However, not all brand-related netnography studies have investigated brand communities and several other brand-related topics are commonly discussed online by consumers. Consequently, netnography has also been used to examine, for example, retro-branding (Brown et al., 2003), brand defending (Colliander; Wien (2013), and luxury brands (Tynan et al., 2010).

Moreover, tourism service is another popular marketing research area for netnographic studies. Similarly to the above discussed marketing topics, an abundance of web sites and online communities devoted to travel and tourism have emerged during the last decade. For example TripAdvisor, the world's largest travel site, offers more than 150 million consumer reviews and had more than 260 million unique monthly visitors during 2013 (TripAdvisor.com). In other words, travel sites are platforms for consumer discussions around tourism and provide the marketing researcher with a wealth of information about consumers' experiences and opinions about travels and destinations. Netnography has thus been a natural methodological choice for a number of tourism service studies. Several topics have been explored, for example, food tourism (Chhabra et al., 2013; Mkono et al., 2013) and tourism experiences (Rageh, 2013; Hsu et al., 2009; Tussyadiah; Fesenmaier, 2009). Björk; Kauppinen-Räsänen (2012) provide an illustrative example of how TripAdvisor can be utilized for marketing research purposes. The authors used TripAdvisor's discussion forum for risk to explore consumers' perceived risk for four different destinations. Also blogs have been used as sources of stories about tourism experiences (Woodside et al., 2007)

Netnography studies in the context of fashion marketing frequently cover fashion blogs. A reason for this focus is the popularity of fashion bloggers and their influence on consumers. In recent years, the fashion industry has shown interest in fashion blogs, and to exploit their marketing potential, fashion companies often provide fashion bloggers with incentives to promote their products. Kulmala et al. (2013) used netnography in the study of six popular Finnish fashion blogs to understand this conflict between naturally-occurring e-WOM and marketing-influenced e-WOM. Another example of a netnographic study of fashion blogs is Phil's (2013) study of fashion bloggers' personal brand building. Also, because of its unobtrusive nature, netnography has helped researchers to understand, for example, how over-weight women experiences mainstream fashion norms through the study of fashion blogs by female "fatshionistas" (Gurrieri; Cherrier, 2013; Scaraboto; Fisher, 2013). But netnographers within fashion marketing have not only studied blogs. We can also find examples of studies of online communities related to fashion. An example is Thomas; Peters' (2011) netnography of brides' discussions of wedding dresses on the popular wedding online community, Brides.com. The authors concluded that the online community plays an important part in the wedding dress purchase decision of brides.

A common service industry to be researched with netnography is the healthcare sector. Netnography offers the option of covertness which sometimes might be necessary for researchers to approach sensitive health-related topics. For example Keeling et al. (2013) conducted a netnographic study of an online community for breast cancer sufferers and illustrate how the community members, on the basis of their own experiences, negotiate their understandings of healthcare services and medications. Also Langer; Beckman (2005) used netnography to research a sensitive topic, namely cosmetic surgery. A covert netnography of an Internet message board on cosmetic surgery allowed Langer; Beckman (2005) to gain deep insights into consumers' opinions, motives, and concerns regarding cosmetic surgery.

Netnography has also been used for a variety of other service-related topics. Basically all sorts of service experiences consumers openly and publicly share online can be used as an input to a netnography. Yang; Fang (2004) adopted netnography for analysis of consumer reviews of online financial brokerage experiences to identify key online service quality dimensions. Another netnographic contribution to service marketing is Brown; Patterson (2009). By means of a qualitative study, including a netnography, of the Harry Potter phenomenon, the authors added an empirical dimension to the otherwise largely conceptual service-dominant logic discussion.

4.2 How has netnography been used?

Netnography has been used in various ways by marketing researchers. Table 3 summarises the main applications in terms of the researcher role, degree of use, combination with other methods, purpose, contents, and domain of data collection. As table 3 indicates, netnography is a diverse and all-encompassing method, applied in various ways for different purposes.

Table 3. Summary of how netnography has been used within marketing research.

<i>Application</i>	<i>Description</i>	<i>Exemplary studies</i>
Role of researcher	Passive observation without direct participation, lurking, spying	Hernandez; Vicdan, 2013; Chan; Li, 2010; Quinton; Harridge-March, 2010
	Active participation: initiation of conversations, quizzes, uploading of videos/pictures, answering to quizzes, commenting	O'Sullivan et al., 2011; Pongsakornrunsilp; Shroeder, 2011
Combination with other methods	Online surveys	Chan; Li, 2010; Janta, 2011
	Interviews, focus group interviews, phenomenological interviews	O'Sullivan et al., 2011; Fisher; Smith, 2011; Hernandez; Vicdan, 2013; Luedicke, 2006
	Videography, ethnography	Fisher; Smith, 2011
	Physical observation	Black, 2011

<i>Application</i>	<i>Description</i>	<i>Exemplary studies</i>
Degree of Use	Partly: data collection/ data analysis	Seraj, 2012; Luedicke, 2006
	Full: entry, data collection, data interpretation, and ethical standards	Colliander; Wien, 2013, Närvänen et al., 2013, Quinton; Harridge-March, 2010
Use purpose	Exploratory research/pilot	O'Sullivan et al., 2011; Chan; Li, 2010
	To explore multiplicity	Yazıcıoğlu; Borak, 2012
	Illustrative examples	Kozinets, 2002
	To explore interactions and sense-making	O'Reilly et al., 2007; Sandlin, 2007
Content included	Text such as comments, discussions, reviews	O'Sullivan et al., 2011; Ismail, 2011; Mikkonen et al., 2011
	Pictures	O'Sullivan et al., 2011
	Quizzes, votes, questions	Black 2011; O'Sullivan et al., 2011; Kelleher et al., 2011
	Videos, vlogs	O'Sullivan et al., 2011; Luedicke, 2006; Kelleher et al., 2011
	Online commercials, webpage marketing messages	Luedicke, 2006; Mkono, 2012
	Textual web diary, consumer journal stories	Leipämaa-Leskinen, 2011; Martin et al., 2007; Martin; Woodside, 2011
	Tweets	Kelleher et al., 2011
Domain of data collection	Online communities, , discussion forums, opinion sites, online support groups	Mikkonen et al., 2011; Lindblad; Ostberg, 2011
	Blogs, weblogs,	Mikkonen et al., 2011
	Mailing lists, Online newspapers, news reports	Luedicke, 2006
	Twitter	Kelleher et al., 2011
	Firm-maintained forums	Luedicke ,2006

The role taken by the researcher varies among netnographic studies. A trend, however, is that netnography researchers increasingly stay passive, silent and do not participate in the researched online communities. According to Björk; Kauppinen-Räsänen (2012), marketing researcher can adopt four different positions in netnographic studies: observer, lurker, spy, or participant. The observer notifies the community about his/her research, but stays passive. The lurker also stays passive and do not inform the community about the conducted research. The spy is an active participant in the community, but do not reveal his/her role as a researcher. The participant is active and notifies the community of the research. From our literature review, we can conclude that lurking is the most common netnography position among marketing researchers. As Kozinets (2002, 65) puts it, "Netnographers are professional "lurkers"..."

The unobtrusive nature of netnography is a key reason for its attractiveness but at the same constitute a real risk. If marketing researchers conduct netnographic studies in an irresponsible way that consumers find to be disrespectful, the image of netnography will be seriously damaged and the future potential of the method spoiled. Kozinets (2002), therefore, recommend the following guidelines for netnographers, they should: (1) fully disclose his/her presence, (2) ensure confidentiality and anonymity to informants, (3) seek and incorporate feedback from members of the online community, and (4) take a cautious position on the private-versus-public medium issue. Kozinets (2002) thus recommend the netnographer to contact community members and obtain their permission to use the postings to be quoted in the research. Following the guidelines of Kozinets (2002) requires a deep involvement in the online community under study. From our review, we can see the opposite, most researchers seem to prefer to triangulate across a large number of online communities or sites, downloading large numbers of messages without asking the members for permission.

Netnography has also been used in combination with several other qualitative methods. Slightly more than 60 percent of the articles use only netnography while the rest combine netnography with, for example, traditional qualitative interviews, ethnography, videography, or physical observations. Many articles complement a traditional ethnography with a netnography. Ideally, the research problem at hand should guide the marketing researcher's decision to perform a full netnography or use the method as a complement to traditional qualitative inquiry.

A good example of a full netnography approach is Scaraboto et al. (2013) who examined the complications of closing down Disney's adverworld (virtual world created for marketing purposes) "Virtual Magic Kingdom" (VMK). By observing blogs, websites, YouTube videos, online communities, photos, and screenshots from VMK, the authors revealed areas of tension between consumers and marketers in connection to the closure of adverworlds. Another example of a full netnography is provided by Radford; Bloch (2012) who, through netnographic inquiry, examined consumers' expressions of grief and consumption-related emotions posted on online communities in response to the death of a celebrity. On the other hand, Fisher; Smith's (2011) study of value co-creation in brand communities is a good example of a combined approach where the authors employed ethnography, videography, netnography, and traditional interviews of consumers. According to Fisher; Smith (2011), the combination of these data collection techniques provided several benefits that any of those methods by themselves could not and hence allowed for a deeper understanding of the nature and process of consumers' co-creation of value.

Other studies use netnographic inquiry as a complement or pre-study to larger quantitative studies. Mixed methods has become a popular research approach in marketing and bridges the gap between qualitative and quantitative methodologies (Bahl; Milne, 2006; Harrison; Reilly, 2011). A mixed methods approach is generally pragmatic, driven by the research questions, and not constrained by paradigmatic assumptions (Creswell, 2003; Creswell; Piano Clark, 2007; Johnson; Onwuegbuzie, 2004, 2007). Chan; Li (2010), for example, combined a netnographic study and a quantitative survey to understand reciprocity in consumer-to-consumer interactions in online communities. More specifically, Chan; Li (2010) used the quantitative survey to validate the findings of their exploratory netnography. A limitation of netnography is the difficulty to generalize findings to groups outside the specific online community sample (Kozinets, 2002). Kozinets (2002) recommend marketing researchers interested in generalization of the findings to employ multiple methods for triangulation. A quantitative study is a credible way to triangulate and validate the findings of a netnography. With a continued interest for mixed methods among marketing researchers, we expect the mix of netnographic studies and quantitative surveys to become more common.

Consequently, netnography is often used as a qualitative data collection technique rather than a full ethnographic method. We can thus see a difference between the original guidelines for netnography provided by Kozinets (2002) and how the method later has been used by marketing researchers. Langer; Beckman (2005), for example, argue that netnographic data is no different from other sources of data found in conventional mass media communication such as newspapers, magazines, or TV-programmes. According to Langer; Beckman (2005), traditional qualitative content analysis can therefore be applied for the collection and analysis of netnographic data. Kozinets (2006), however, remains critical to the idea of treating netnographic data as content to be content analysed. If the ethnographer is removed from the netnography, and the data treated as any type of mass medium content, the possibilities for cultural understanding are removed according to Kozinets (2006). Kozinets (2006), a trained anthropologist, emphasizes the need for cultural knowledge and cultural investigation in a netnography for it to build valid understanding of the studied phenomenon. If a trained and experienced ethnographer is a requirement of a reliable netnography, it poses a challenge as most marketing researchers do not fulfil that criterion. Our impression from this review is that most marketing researchers are more comfortable utilizing netnography as a technique for data collection rather than performing a full ethnography. Hence, the levels of usage of netnography are needs to be further addressed by future research.

The way netnography has been applied also relates to the research purpose and role of netnography in the study. In its beginning, Kozinets (2002) used netnography to provide illustrative examples of the studied phenomenon. Subsequently, netnography has frequently been used in exploratory research, either as a sole data collection method, or as a pilot study for further studies. For example, O'Sullivan et al. (2011) successfully used a netnography to explore the process contributing the genesis of a brand community. However, the review also uncovered other use purposes, such as using netnography to explore multiplicity and variety in behaviour and attitudes between cultures (Yazıcıoğlu; Borak, 2012) and to explore consumers' interactions and sense-making (O'Reilly et al., 2007). The in-depth nature of netnographic data also enabled, for example, Sandlin (2007) to understand how education and learning occur in online communities.

Many marketing researchers see great benefits in the dynamic and flexible nature of netnography, allowing for in-depth, rich, timely, and continuous naturalistic data. Netnographic data is typically text-based such as customers' comments, discussions, and reviews. However, netnography has also been applied to pictures and videos. Luedicke (2006), for example, downloaded and analysed 200 pictures and 40 minutes of videos in his netnography about the role of social environments for brand communities. As the aim of the study was to explore how the HUMMER brand community negotiated a set of core distinctions with and against its social environment, ads (pictures and videos) became an important complementary data source. More in-depth qualitative data into specific themes is also found through textual web diary and consumer journal stories (Leipämaa-Leskinen, 2011), whereas simpler information is found related to customer opinions through quizzes, votes, and questions (Black, 2011). Also webpage marketing messages represent an interesting type of netnographic content related to firm activities. For her study of how authenticity is projected onto cultural objects, Mkono (2012) downloaded and analysed not only online tourist reviews, but also the webpage marketing messages of two Victoria Falls restaurants which offer cultural experiences for tourists.

A large variety of domains have been used to collect data in netnographies. Common domains are online communities, discussion forums, opinions sites, blogs, where customer behaviour is not directly linked to companies, but rather related to interest areas (e.g. Mikkonen et al., 2011). The reason can be found both in the consumers' great interest for these virtual hangouts (a netnographer needs to be where the consumers are) and in the origin of

netnography as a method for studies of virtual communities (Kozinets, 1998). But as social media and online services has evolved, so has the domains of netnography. Popular domains for collecting netnographic data today involve Facebook, Twitter, Youtube, TripAdvisor, mailing lists, or online newspapers. A good example of the use of social media is Kelleher et al. (2011) who used blogs, Twitter, Facebook, and Youtube in their netnography on value co-creation in an online crowd-sourced community. In that sense, the authors complemented the information on the online community under study with information from social media domains linked to the community. Although customer-dominated forums are the most frequently used, netnographic data has been collected also from firm-maintained domains (e.g. Luedicke, 2006; Mkono 2012).

5 Discussion and implications

This study synthesised 149 netnography articles published between 1997 and 2013 and it contributes to the marketing literature by its comprehensive overview and analysis of netnography in marketing. The findings reveal an increased use of netnography in marketing research, especially in the last six years. This increase reflects the intensified online activity of consumers and the blurred boundary between consumers' lives online and offline. As consumers' lives increasingly move into online worlds, marketing researchers must follow, and netnography provides that opportunity (Kozinets, 2006; Rokka, 2010). Our systematic review of netnography articles reveals a wide variety of research contexts and marketing topics covered. The review also shows the diversity of ways in which different marketing researchers have employed netnography. The variation of netnography studies within marketing literature gives the picture of a flexible and adaptable qualitative method with a great potential for future use in marketing research. As the first generation of "digital natives" grow up to become the consumers of tomorrow (Palfrey; Gasser, 2008; Thomas, 2011), we expect the interest of, and need for, netnography among marketing researchers to continue to increase.

We believe the use of netnography in marketing research has only started and see a great potential for future use of the method. Indeed, netnography is a naturalistic, unobtrusive, and adaptable method with analytic depth and rich and dynamic data (Kozinets, 2002, 2006; Podoshen; Hunt, 2011). Netnography, however, also brings challenges such as huge data sizes, ethical issues, and anonymous informants (Rokka, 2010; Lu, 2011). This review has several implications and interesting research opportunities for researchers. We also see issues that need to be addressed to secure quality and trustworthiness of future netnographic research. Table 4 summarises the main theoretical, empirical and methodological issues that emerge from the review of existing netnography studies.

Table 4. Future research directions for netnography in marketing.

<i>Emphasis</i>	<i>Future research directions</i>
Theoretical issues	<ul style="list-style-type: none"> Exploring the offline/online border in consumers' lives and how the adoption of new technology affects service usage Increased focus on service innovation, S-D logic, value creation/value destruction online, customer sense-making, customer logics, customer-to-customer interactions
Empirical issues	<ul style="list-style-type: none"> What customer insight can be gained by using netnography? Is the information trustworthy? Moving beyond tourism and healthcare services into other service contexts Exploring social networking sites rather than only brand communities Using netnography for studying business customers How does the domain of data collection influence the nature of the data retrieved?
Methodological Issues	<ul style="list-style-type: none"> Synthesizing how netnography can be integrated with other qualitative and quantitative methods Establishing different procedures for researcher input (active/passive) Development of longitudinal studies Establishing ethical procedures for data collection and analysis Establishing how the data collected be used in the most efficient way Outline different forms/ways/levels of netnography use

The review reveals that, as netnography was developed by Kozinets (1998) as a consumer research tool, marketing researchers in the fields of consumer behaviour and consumer culture have largely paved the way for netnography into general marketing research practice. This early adoption of netnography is also reflected in the publication outlets and research contexts. Consequently, we see the potential for netnography use also in other areas of marketing research. The business-to-business researchers, for example, are yet to discover netnography. Although a few articles were published in general business journals, we did not find any netnographic studies focused on business-to-business or industrial settings. In fact, the netnography method seems closely connected with business-to-consumer research. Partly it is probably due to its origin in the area of consumer research and consumer culture (Kozinets, 1998, 2002). Also, consumers are more prone to share their consumption stories online than, for example, managers or other corporate

representatives. In fact, it would in many cases be unethical by employees to openly share company information in public online communities. Netnographers normally collect data from such publicly available online forums, and access to internal corporate online communication from, for example, intranets, is difficult without the permission of the company. Despite of its challenges, we still think the business-to-business setting is an underexplored area for netnographic inquiry that deserves future attention. Similarly to traditional ethnographic studies in business contexts (Watson, 2011), we expect a netnographic approach to have the potential to capture things of relevance other methods would not. As any real netnographer, however, the netnographer needs to seek permission to be granted access to company communication. A netnography of, for example, a company's intranet could be a useful complement to a traditional ethnography of the same organization.

We also believe that netnography has the potential to serve a broader range of service marketers and encourage more use of the method in this particular field. Services along with consumer goods are the typical type of everyday consumption that is discussed every day online by consumers all over the world. In contemporary service marketing, the customer's role as a value (co-)creator (Vargo; Lusch, 2004, 2008; Grönroos, 2008, 2011) has been emphasized and it is widely agreed that value actualization takes place in the customer's consumption process during usage (Gummesson, 2007, Grönroos; Raval, 2011). Arguably, to understand how value is formed in customers' processes, marketing researchers need to understand how services are "embedded in the customer's context, activities, practices, and experiences" (Heinonen et al., 2010, 533). Netnography with its unobtrusive nature and ethnographic characteristics is a useful tool for entering the customers' context and understand the realities and everyday lives of consumers (Kozinets, 2006). We therefore believe netnography to be a suitable method for learning about how service firms can support customers in their everyday life and thus facilitate value creation.

We also encourage a diversification in the use of netnography among marketing researchers. The method was developed as an adaptation of ethnography for studies of consumer behaviour of virtual communities and cyberculture and Kozinets (1998) strongly emphasize full participation in the community under study. To participate and gain recognition as a cultural member constitutes an important part of the field work according to Kozinets (1998). Most netnographers today, however, stay passive observers and triangulate across several online communities rather than actively engage themselves in one particular online community. Netnography is also often used as a complement to traditional qualitative data collection techniques, such as interviews. In a way, netnography has developed into an umbrella term for various forms of online data collection and analysis. It is clear from our review that few articles follow the outlined steps and guidelines of Kozinets (2002, 2010), including, for example, full disclosure of the presence and agenda of the researcher in the online community. We thus need to address what forms netnography can take and if diversity in use of the method is a problem or something positive. A key issue here is which criteria netnography studies should be evaluated against, Kozinets' (1998, 2002, 2010) original guidelines or general principles for quality in qualitative research? To avoid confusion, we recommend netnographers to disclose the methodological assumptions of their studies.

Also, as Dumitrica; Gaden (2008) show, the online and the offline world can no longer be neatly separated as consumers bring their offline identities, values, meanings etc. online. If the offline world and the online world are intertwined, it makes sense to combine netnography with traditional qualitative inquiry. Several successful examples of such an integrated approach exist (see, for example, Kozinets; Handelman, 2004; Patterson; Brown, 2009; Schau et al., 2009; Brown, 2012, 2014). In other words, netnography can serve as a means of triangulation and thus contribute to a broader and deeper understanding of the topic (Flick, 2004). Based on our review, we want to emphasize how a netnography can contribute in many ways to the overall qualitative study, for example by giving the researchers insights that could not have been obtained offline or add a longitudinal dimension to the investigation. Longitudinal research offers the researcher a possibility to capture and understand changes in consumers' processes but is seldom used in marketing research because of the time and costs involved (Bryman; Bell, 2011). Both time and costs are lower for an online longitudinal study than a traditional longitudinal study design. As ethnographic studies are longitudinal in nature, we believe netnography can constitute a valuable longitudinal part of a qualitative study or complement an offline longitudinal study.

Managerial implications can also be drawn from this study. For companies, netnography provides a window into the lives and realities of their customers (Kozinets, 2006). Netnography for managerial purposes, however, needs to be used with caution. Customers may feel like the company spies on them. Table 5 summarises the main managerial issues that can be drawn from our review of netnography studies.

Table 5. Managerial implications of netnography in marketing.

Emphasis	Managerial implications
Context of study	<ul style="list-style-type: none"> • Insight into a broad range of business contexts is lacking • B2B sector is underemphasised • Evaluate how netnography can be used in the company's industry? • Business customers can also be studied, through for example communities of practice
Role of researcher	<ul style="list-style-type: none"> • Is observation sufficient or should managers be more involved in data collection? • How can managers retrieve data? Who should be responsible for data collection and analysis? • Can managers be more involved in different communities?
Combination with other methods	<ul style="list-style-type: none"> • Netnography is typically used in combination of other studies • Strengthen the role of qualitative data in understanding key topics • What other methods could be used?
Degree of Use	<ul style="list-style-type: none"> • What are the resources available for data collection and analysis? • Should netnography be used in combination with other methods?
Use purpose	<ul style="list-style-type: none"> • What are the research objectives? Deep insight or comparable differences? • Is netnography used to connect to and engage with customers? • Should existing or potential customers' be studied?
Content included	<ul style="list-style-type: none"> • Is textual information sufficient, or should other types of content be retrieved? • What types of content can be meaningful and useful to elicit?
Domain of data collection	<ul style="list-style-type: none"> • What is the best forum for data collection? • How does the domain of data collection influence the nature of the data retrieved? • Should companies do several netnography studies in different domains?

Based on our extensive review of the netnography literature in marketing, we would encourage companies to utilize netnography in order to better understand their current and future customers. By being online together with their customers, companies can take part of their customers' thoughts, opinions, and ideas in a way that previously has been very difficult. The companies who grasp the opportunities provided by netnography for consumer insight will have an edge against their lesser informed competitors (Kozinets, 2010). We already see this trend in terms of an increasing presence of companies and organizations on, for example, Facebook. Moreover, most of the netnographic studies in our systematic literature review are conducted in online communities, with a particular focus on online brand communities. But we think marketing researchers need to move beyond the traditional online community. As suggested by Kozinets (2006), blogs, networked gamespaces, instant messaging chats, and new forms of mobile communication technologies are increasingly interesting and most likely the places for future netnographies. The flexibility of netnography allows for pure observation as well as active participation and makes the method adaptable for most virtual arenas.

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Mobile forest berry map service: co-creating value from open public data

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Grounding on emerging wild food phenomenon among urbanizing citizens, established everyman's rights in Finland, publicly open forest resource data, scientific wildberry crop models (bilberry, cowberry) and weather data in the future, this study analyses mobile berry map service as a new business opportunity. Customer-value interviews (n=52) and two business model CANVAS workshops are used to outline the main features of a potential berry map service as well as related risks. Identified values-in-use associate with lifestyles in urban-rural continuum. Open data gives promise, but value-creation is still complex. A more thorough value-network survey and user exercises employing participatory design are suggested.

1 Introduction

While general servitization of societies has recently increased public discourse about the role of services in fostering economic growth, service research has focused much on value co-creation and value-in-use perspectives. In service-dominant logic (Vargo; Lusch, 2004; Lusch; Vargo, 2014), service is understood as exchange of service, goods provide value only in use and in context, and value creation is an interactional process. The task of companies is to offer value propositions to their customers, and companies' resources and skills are key to their competitive advantage. Recent developments in service design may help companies to strengthen their service orientation in enhancing their business (Wetter-Edman et al., 2014). This is particularly relevant with business models targeting those sections of society that are entering a systemic change, such as green economy, digitalization, or new governance, etc.

Emerging everyday life values within Finnish society, e.g. wild food and homing phenomena in particular among urban people create space for new value-creating service innovations. The above trends are connected with the recognized rise of the lifestyles of health and sustainability (LOHAS) and sustainable food consumption (Kirveennummi et al., 2013). There is a reason to presume that new service business around sustainable consumption will be designed along with social innovations (Mont et al., 2014), meaning that companies' new services will increasingly foster novel kind of interaction for which the role of the government is to provide open public data.

Together with traditionally established everyman's rights in Finland, the above consumer trends indicate that picking of wild forest berries could become more popular in Finland. However, urbanized people might not be well aware of good berry picking places. In addition, the well-known picking places near major cities may become overcrowded and over-utilized. This indicates needs to provide urban berry pickers with information on potential berry picking places. This information can be augmented with other relevant information as well as various navigation tools that are useful and support this hobby. A well-functioning berry map service could benefit also other nature-based businesses such as tourism and berry processing industry, and it could thus contribute to economic growth and rural livelihoods. Furthermore, it could serve educational purposes and improve citizens' nature relations. Interdisciplinary (biology, ecology, geography, sports, communication...) educational use of berry map software could be used in schools, and the whole pedagogical concept could be exported.

The amount of open public data grows rapidly also in the area of natural resources. Recently, Finnish Forest Research Institute (Metla) released the multi-source forest inventory data openly available. This information, open map information from the National Land Survey and open weather data from the Finnish Meteorological institute, comprise a set of open public data that could be combined and delivered in a form of a forest berry map service. To make this vision a reality, some research work needs to be done with berry crop models as well as with the service preconditions.

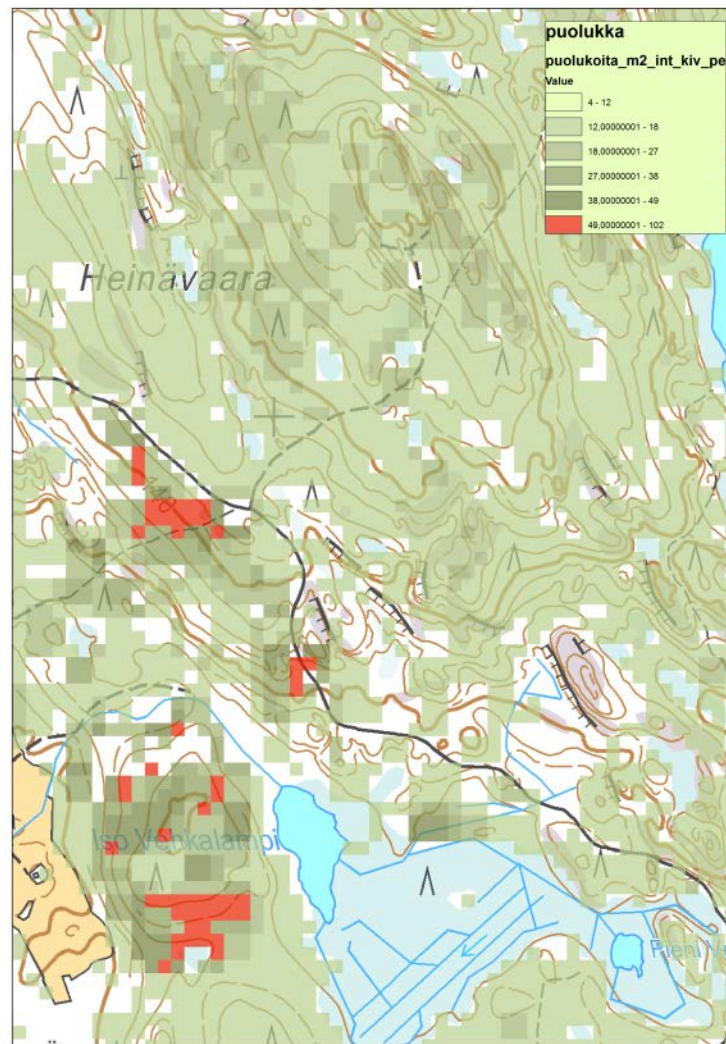


Figure 1. A piece of an estimated cowberry crop map (width: ~1,1 km) from Heinävaara, Liperi, close to Joensuu airport in eastern Finland. In this map, each berry-map pixel represents 20 x 20 metres on the ground and shows the average number of cowberries by square meter.

Typically, the yield models for e.g. berries or mushrooms predict the yield of the non-wood forest product (NWFP) based on the value of forest-stand-level biometric variables (e.g. basal area, density, age etc.) that are controllable by forest management. Therefore they provide the information needed to assess the impact of management options on the provision of NWFP. In addition, it is evident that also environmental variables reflecting the topographic and climatic conditions, which cannot be controlled by the forest manager, affect the yield of NWFP. In Finland, models for bilberries (Miina et al., 2009) and cowberries (Turtiainen et al., 2013) have been recently published. In addition to forest planning calculations, their use situations include drawing digital maps in which potential berry picking places could be shown to interested ones (Figure 1). In fact, these berry crop models may be the glue that helps to combine the various open forest data sources together as a service in a meaningful way. Directing research efforts from data collection to data analysis and utilizing new interdisciplinary open source data sets make a strong basis for new service innovations.

2 Objectives

This study analyses mobile forest berry map service as a new business opportunity in the frame of green economy. More specifically, the study aims at i) learning on urban and rural berry-pickers' value-creating processes as a basis for the berry map service; ii) clarifying the added-value opportunities and underlying risks that the open public data for berry maps involves; and iii) identifying the core components and prioritized action steps when approaching an operable and profitable, customer-oriented business model around the forest berry map service.

3 Materials and Methods

New service opportunities may be investigated with multiple alternative conceptual perspectives (Zott et al., 2011). While this study represents the first steps in studying forest berry maps as business, it was reasonable to rely on an established and well-structured framework that can be easily learned and adopted from practical examples. Therefore

this study applied the CANVAS business model (Osterwalder, 2004; Osterwalder; Pigneur, 2010) as a conceptual framework. The original CANVAS model comprises nine building blocks (Figure 2), but in this study the business model concept was augmented with three additional building blocks in order to strengthen the competitive advantage viewpoint as suggested by Kajanus et al. (2014) (Table 1). The twelve building blocks structured the contemplation of berry map business (Figure 3). In essence, the theme customer and competition was expanded by adding the building blocks customer need, company solution, and competitors.

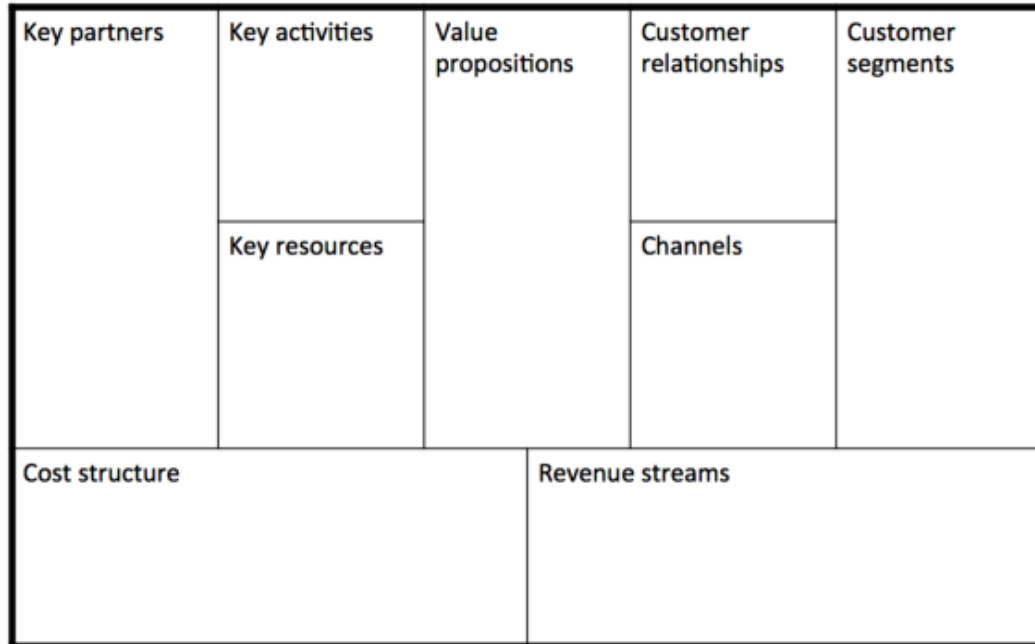


Figure 2. The building blocks of the original business model CANVAS by Osterwalder and Pigneur (2010).

Table 1. The themes and building blocks of the expanded business model CANVAS according to Kajanus et al. (2014). The added building blocks are marked with *.

Themes	Building blocks
Customer / competition	Customer segments *Customer need *Company solution *Competitors
Offering and service touch points	Value proposition Channels Customer relationships
Resources	Key resources Key partners Key activities
Profit formula	Revenue streams Cost structure

Content to the business model was produced in two facilitated workshops, held in Kuopio in May 11, 2014 (Figure 3), and in Joensuu in July 31, 2014 (Figures 4 and 5), involving 9 and 6 participants, respectively. The workshops represented expertise in the multiple-use of forests, berry crop models, forest information logistics, social applications, GIS and map-based services, service design, and business model generation. The first author of this paper participated in both workshops, and the second author participated in the second workshop, thus the study may be seen as participatory action research in which the researchers had an active role.

The both workshops started with a 10-minute introduction to the initial berry map ideas and a 5-minute introduction to business model CANVAS. After that a paper of each CANVAS building block was put on the wall and small groups of participants circulated between the papers, discussing and adding content. At the end of the first workshop, each participant rated all generated ideas using SMART numeric rating technique (Edwards, 1977). After that a core value calculation, a simplified version of robust portfolio modelling (see Kajanus et al. 2014) was employed to identify the

most promising combinations of ideas. Finally, the rating exercise was summarized with discussing the implications from the viewpoint of berry map business model.

Between the two workshops, a simple query to 52 potential berry pickers was conducted in order to find out why and how they would use a berry map service and for what they would be willing to pay. The interviewees represented western, eastern and southern Finland and varying backgrounds with respect to age, urban-rural lifestyle continuum, occupational status and berry-picking experience.

The interview data was qualitatively assessed and classified into values-in-use. The second workshop made use of the acquired knowledge on berry pickers' value creation and developed further the CANVAS outcomes of the first workshop. The second workshop also contained an in-class simulation of how to use mobile berry map software using an artificial model of a forest (Figure 4) and principles of participatory service design (Steen et al., 2011). Finally, the participants identified important next step actions and prioritized them with the SMART technique.

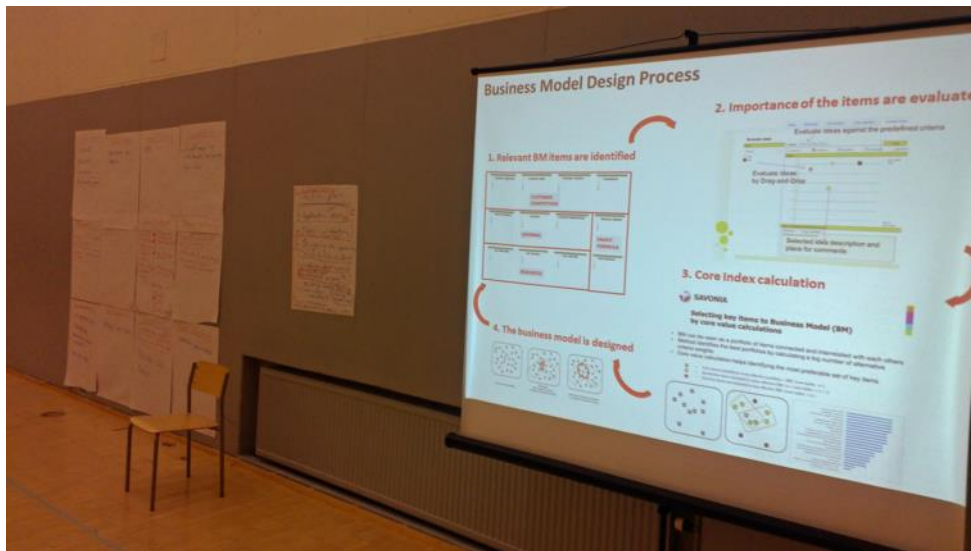


Figure 3. Instructions for business model design process on the slide and CANVAS exercise output on the wall at the end of the first workshop.

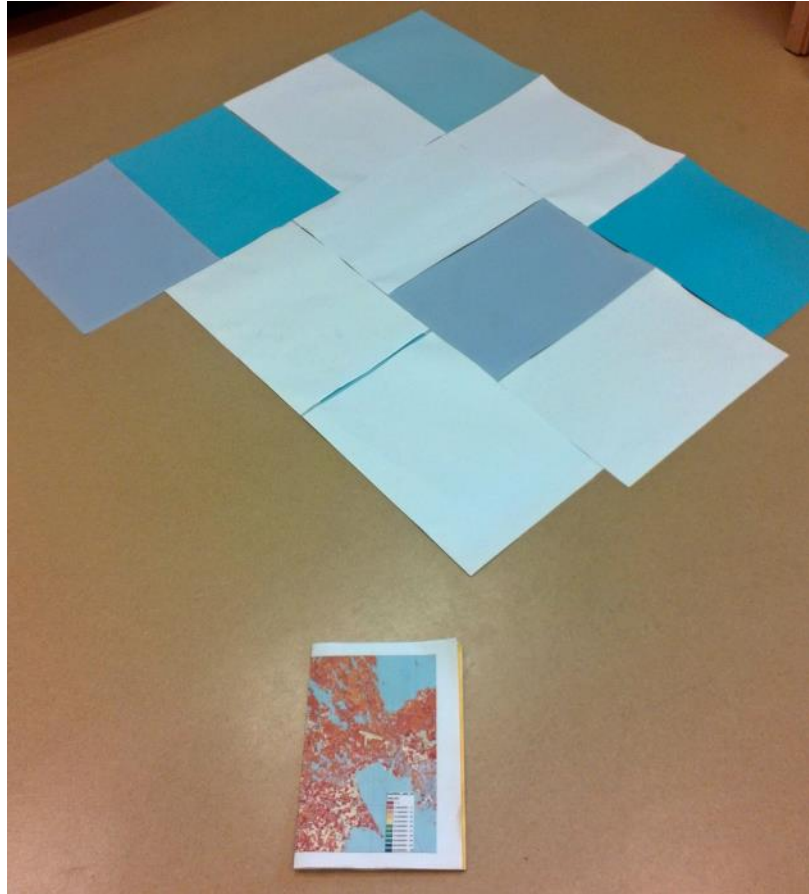


Figure 4. Simple indoor-simulation environment at the second workshop: an artificial forest with bilberry sites of varying crops and a mobile device with berry map opened.



Figure 5. Part of the CANVAS outputs on the wall during the second workshop.

4 Results

The qualitative analysis of potential berry-pickers' interviews yielded four values-in-use categories (Figure 6) that represent the meaningful purposes for which the interviewees might use the berry map software in their everyday task environment. Exploration category includes values that emerge when using the berry map enables to find new berry

sites in different circumstances; it feeds curiosity. Problem-solving category contains values that relate to receiving contextual information as answers to practical questions before or during the berry-picking trip. Convenience category contains values that are related to easiness and efficiency. Amusement category comprises values that emerge when playing and having fun.

Exploration	Problem-solving	Convenience	Amusement
<ul style="list-style-type: none"> • Encouragement, motivation, pushing effect • No familiar forests or anyone to ask: advice on where to start picking • Enlarging one's own berry picking territory • Interesting to see tracks on map afterwards 	<ul style="list-style-type: none"> • Planning a berry picking trip (desktop use) • Finding berries during domestic travelling • Finding new sites nearby if old ones are empty or if berry season in general is poor • Checking how to get there and what the terrain is like • Helps to see from the track which corners of the site are still unvisited • Using berry maps as a proxy for grouses when hunting 	<ul style="list-style-type: none"> • Efficient in everyday life and with children • Avoids useless wandering in forest: saves time and helps to get berries • Sharing berry site information within a family network • Helps in navigation and walking distance estimation • Functional exercise 	<ul style="list-style-type: none"> • Entertainment, adventure (comparative to geocaching) • Getting to know new places, variety

Figure 6. Identified values-in-use, classified in four value categories.

It appeared in both CANVAS workshops that the most promising target group in the first phase of launching the berry map service might be urban berry-pickers who lack the local knowledge of berry sites. They occasionally pick smaller amounts of berries. One to three yearly berry-picking trips for them are special and they tend to plan those trips carefully. For this berry-picker group, the social features of such a service are by default important, but the interviews indicated that they hesitate to share their own berry site information openly and would rather share it within their family network of with friends. However, this user segment would benefit from the fresh and updated berry crop information if somebody would share it for them. At least they were willing to store berry site information for their own personal use. In addition, they could use related services during their berry trips, such as accommodation or restaurant.

Overall, the interest towards the development of the service is broad – almost all workshop participants and interviewed people could easily identify use-situations where the service could help them to create value. It is notable that the values associated with the berry map idea were diverse, thus offering rather broad opportunities to service companies to start designing the marketing of their berry map service. However, the service will not sell itself: it was recognized in the second workshop that launching the service with the aid of active first users, advocating associations and change agents will be extremely important to the success of social uptake.

The interviews of potential service-users indicated that more experienced berry-pickers in rural areas know the berry picking places quite well. Their responses revealed that they could use the service in a case where their own berry-picking place is not providing them enough berries. However, most of them were not willing to pay for the use of the service.

The interviews and workshops indicated several risks related to the berry map service concept. Most prevalent of those risks are:

- Forest owners' negative reactions when berry-pickers are guided to enter their forests; unwritten interpretations on what everyman's rights include in practice.
- Historically strong culture that berry sites are secrets and not to be shared.
- Errors in information given in the berry map service. It can be so that the berry crop models are not good enough for predicting the yields and the data may not be updated regularly enough. This problem relates to the fact that recent forest management activities immediately affect the yield.
- High between-year variation in berry yields. The models predict the mean berry yield, and those estimates may not be very accurate on a certain year.
- In a case that the service is a commercial product, the willingness-to-pay of the users is not very clear yet and thus the business attractiveness of the service to companies is unclear. In the case of public service, the maintenance of the service demands resources, which are also uncertain.

Table 2. Identified prevalent next action steps and their importance ratings.

Action		Average priority score
1	Survey/market study in pilot area (Customers, berry buyers, advertisers, associations)	0.210
2	Project application for external funding enabling building a pilot version of the service	0.194
3	Risk analysis (model accuracy, landowners' opinions, updating resources etc.)	0.169
4	Define the information content of the first berry map version (NTFPs to include, information content etc.)	0.147
5	Collect key research partners	0.142
6	Identify and commit commercial IT company partner(s)	0.137
Sum of priorities		1.000

The simple rating exercise of the six important next step actions revealed that the participant highlighted the importance of a more thorough market study and resource pursuit for piloting the service (Table 2). The market study would target the whole value co-creation network, i.e. not only the ordinary berry-pickers but also berry buyers, advertisers, third sector associations, etc. The project application for external funding would enable defining the berry map software the values-in-use perspective in mind. These two actions were clearly more highly rated than the other four.

5 Discussion

The customer need for a berry map service and new kinds of use situations seem to be emerging. This study mainly concentrated on the needs of private households when studying the basis of the service. However, other potential users of the service are e.g. rural tourist entrepreneurs who offer accommodation services. An attractively delivered berry map service could support their main business – if tailored to the needs of their tourist customers. In addition, commercial berry picking could benefit from the service in two ways: first, the berry map service would help the logistics and guidance of employed berry-pickers, and second, the berry buyers could use the service to encourage people to pick more berries for selling. Both these potential benefits of the service may have impacts on the global markets of forest-based bioeconomy. Together with the added value on tourism entrepreneurship, the open public data cultivated to forest berry map service could induce important indirect impacts, thus boosting the economy of several business sectors and mobilizing green growth. However, the challenge remains how to collect enough payments from all potential berry map users in the first phase so that profitable business around the actual berry map service becomes a reality.

Converting the yield prediction information to potential berry picking place application for smart phones and tablet devices needs a lot of development work. Numeric yield calculations should be presented in maps of such a format and visual outlook that they are coherent and clear on small displays. Also technically working computer application, which is tested on different platforms and smartphones and provides all needed features have to be programmed. Luckily enough, recent development in mobile location-based social applications has provided tested solutions and components that are probably relatively easily adoptable in the berry map service as well. The more challenging part than the user interface is the server software. It is evident that a skilled team of participative software designers needs to combine their experience in the berry map software project in a near future.

The study was an initial attempt to shed light on forest berry maps as business involving value co-creation. As such it yielded a preliminary understanding of the diverse values that using the forest berry map mobile service may create among berry pickers. The resulting ideas for business model CANVAS elements serve the purpose of refining the content as well as the technical details of producing forest berry map information for the mobile service (e.g. thematic layers, classification, resolution, etc.). The expanded CANVAS (Kajanus et al., 2014) appeared to emphasize the company solution as a response to customer need, which is very essential in the business model concept. The rating of CANVAS ideas using SMART technique was simple enough but still provided a sophisticated base for summarizing the exhausting idea generation phase: based on this experience the business model design process is recommended to be conducted combining qualitative and quantitative parts sequentially.

The workshops produced necessary information for defining a demo application and organizing user tests of the service in an authentic environment. Furthermore, the identified business opportunities and risks will enable ICT-companies to assess their interests for getting involved in berry map service business in collaboration with public service providers and third sector collaborators. The study represents collaborative service design in the service-dominant logic framework (Steen et al., 2011). In the future it is recommended to continue the efforts with the aid of systematic co-design. The combination of service logic and service design approach (Wetter-Edman et al., 2014) will be an asset when targeting new kind of value-creating services based on open public data. However, the open public data as such is not a magic key to success: understanding value-creating processes is more important, and the availability of necessary data enables the new service experiences and new company strategies.

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Hand in hand: When design put things into places

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The aim of this paper is to explore the role of design in supporting user-centred development of services and transformation of service organisations. Especially the focus is on bottom-up and top-down service development approaches in the context of service ensembles provided by multiple, interlinked public, private and third sector organisations. The paper presents findings from two separate design case studies. The first study focuses on the organisational perspective in the context of services for elderly, and the second on the customers' perspective in the context of services for immigrants. The findings highlight how the designerly ways of gathering, visualizing, analysing and sharing information may enhance service development.

1 Introduction

In recent years governments all over Europe have faced challenges to respond to the increasing needs for public services. For example, providing services for a growing number of ageing population and the integration of immigrants, are challenging current public service systems. Furthermore, due to economic meltdown the funding of public services is more inadequate than before. In this situation it is increasingly important to make the services more effective and sustainable, and look for alternative service solutions. For example, overlapping service processes and lack of communication, information sharing and coordination between service organisations result inefficient use of scarce resources. At the same time citizens struggle to find their way in the bureaucratic 'service jungle'.

Recently public organisations have become interested in novel approaches for developing services, such as service design among others. Service design is an approach that utilises design methods for developing new and improving existing services. The holistic understanding of the service systems, the process-nature of services and the human perspective in service development are emphasised in service design. Concepts such as touchpoints, service encounters and service journeys have been used to denote the interplay between the customers and their environments. Such service encounters and journeys are often explored as interactions between an isolated service provider and its customers. However, especially in the context of current challenges with the public services it is crucial to understand services more holistically from customers' perspective. Thus, it is important to explore service networks that are formed as the service encounters with various service actors are embedded in the customer journeys. In this paper customer journey is defined as series of service encounters customers have with complementary public, private and third sector organisations, as part of their process to achieve the desired objective.

Recent advances in the field of service design have approached services as complex systems. For example, according to Junginger and Sangiorgi (2009) service interactions and experiences occur within wider systems of actions and actors whose behaviour can't be predicted and designed in details. Different approaches for service development has also been studied by Sørensen and his colleagues (2013). Traditional top-down approach concentrates on development based on strategies, taking place at research and development units, under the supervision of managers. Top-down directed service development is usually based on organisations' strategy and often involves systemised processes led by management, marketing, and research and development departments of the organisation (ibid). Bottom-up approach, on the contrary, takes the customers' and frontline employees' perspectives as the starting point for the development. Bottom-up approach is often based on small, scattered changes and non-systemised processes; such as customer or frontline employee may unintentionally create a new solution or detect a new demand (ibid). For example, employees may adjust their daily practices to particular customers' problems. Sørensen et al. (2013) suggest that it is crucial to understand also in the bottom-up development as only the back-office has resources to develop an idea further, test it and implement it.

There is also a growing interest in to develop public services. For example previous research on design in the context of public services includes themes related to design methods and tools suitable especially for public sector (e.g. Bason, 2010; Botero et al., 2012; Vaajakallio et al., 2013; Kronqvist et al., 2012). In addition design is seen as an approach and a process that can enhance the organisational transformation while developing new services (e.g. Junginger; Sangiorgi, 2009; Junginger, 2009; Sangiorgi, 2011, Deserti; Rizzo, 2014). This organisational transformation is especially important since the citizen-centric 'bottom-up' perspective entails changes in the traditional 'top-down' led public organisations. The bottom-up approach challenges also the role of design and designer. For example, Sangiorgi (2011, 31) states, "the service design practitioners have been moving from providing solutions to specific problems, to providing organisations with the tools and capacities for human-centred service innovation". Furthermore, Junginger and Sangiorgi (2009) claim that this change in focus is particularly true when designers aim to have a transformative effect on organisations and the emphasis is on open, participatory and iterative design processes that build capacities from within, and see users and service employees as co-producers and co-designers of the final solution.

As identified before, public organisations are in need for novel tools and approaches to cope in the changing environment. They need to question the current organisational structures and decision-making procedures to support the continuous bottom-up service development. However, they still lack feasible tools and approaches for enhancing continuous collaboration inside organisations, between organisations and with the service users. In this paper we explore how the designerly ways of gathering, visualizing, analysing and sharing information within and between organisations could enhance combination of bottom-up and top-down service development approaches in context of public services.

This study combines recent findings from the fields of service research and design research. The study contributes to the discussion on enhancing the efficiency of public services through more customer-driven, bottom-up approach. In addition this study examines design tools and approaches that public organisations may utilise for combining bottom-up and top-down service development. The aim of this paper is, thus to explore the role of design in supporting user-centred development of services and transformation of the service organisations. Especially the focus is on bottom-up and top-down service development approaches in the context of service ensembles provided by multiple, interlinked public, private and third sector organisations. The approach is illustrated through two case studies; the first is in context of services for elderly living at home and the second, in the context of services supporting immigrants' integration to a new country. The first study focuses on the organisations' and the second one to the users' perspectives. In addition, the studies look at the needs and possibilities for horizontal inter-organisational collaboration.

The paper is structured as follows: Firstly, we briefly introduce recent literature related to service design in the context of public services, service design methods, and design in the context of organisational transformation. Secondly, we introduce the two design case studies. Thirdly, we discuss the findings from the cases and the literature together. We end the paper with the concluding remarks.

2 Service design, public services and organisational transformation

In this section we review relevant literature from the fields of design research and service research. We start by focusing on designing for public services and service design methods. We then continue with the role of design in organisational transformation.

2.1 With service design towards more customer-oriented public services

Recently service design researchers have increasingly become interested in the designing for public services (e.g. Bason, 2010; Junginger, 2013; Sangiorgi, 2011; Vaajakallio et al., 2013). For instance, Mattelmäki et al. (2014) anticipate the applications of empathic design approach in development of public services in the future. Researchers are interested also on larger changes in the public sector, its services and their development. For example Bason (2010, 14) calls for public sector innovation ecosystem built through four simultaneous shifts: *"1) a shift from random innovation to a conscious and systematic approach to public sector renewal, 2) a shift from managing human resources to building innovation capacity at all levels of government, 3) a shift from running tasks and projects to orchestrating processes of co-creation, creating new solutions with people, not for them and 4) shift from administrating public organisations to courageously leading innovation across and beyond the public sector"*. These shifts aim at continuous design of whole public sector; it's organisations and services. It is evident that public organisations need to change, but what organisational transformation is about? And how design can enhance it? Junginger (2013) discusses the role of design in the policy-making and implementation as problems of design and as activities of design. According to Junginger (2013, 1) *"policies themselves are not yet fully acknowledged as design outcomes in contemporary policy studies. Instead, this literature treats design almost exclusively as an isolated, in-itself-closed activity, part of problem-solving that begins after a policy problem has been recognized as such and defined."* Junginger (2013) critically engages with this view of design and identifies it as an obstacle for the kinds of innovation and transformation public sector now seek to initiate and materialize. Service design tools enable policymakers, governmental organisations and service users to explore current services and anticipate future possibilities collectively.

There are many innovative cases of design for public services that were initiated by policymakers and in which changes were implemented also from bottom up, or by active citizens mobilising a local community. First, one of the most respectful governmental digital service run by UK government cabinet office is www.gov.uk website because of its size and complexity (Design Council, 2013). The website offers British citizens information about taxation, help them to find jobs or benefits; the website is user focused rather than siloes structured governmental service website. Another good example is Casserole, a peer-to-peer service designed to support neighbours who are not always able to cook for themselves. The neighbours, who want to share extra cooked food with older people in their area provide the meals. A private service design company designed the service, the boroughs are responsible for service organisational structure and the neighbours run the service (FutureGov, 2012). Both cases represent user centred design approach that is based on the understanding of the service users and their needs. Casserole is linking traditional governmental service structures and the emerging citizen-driven action. A third example is the Danish tax authority that engaged their users, a group of young people, to help service providers, the Danish Tax and Customs Administration, to communicate their services more efficiently to younger users. The project was done in collaboration with MindLab. The same cross-governmental innovation unit conducted a project on Nordic schools together with the Danish Ministry of Education. In

this project the change was implemented from bottom-up with involving individual pedagogues, teachers, and headmasters with the children and their parents. At the policy decision level, a school committee councillor was interviewed from two different municipalities. This is quite unusual for the school system, which is normally developed from top-down (MindLab, 2014). A fourth example comes from Helsinki where a community worker initiated an idea of refuge hospitality club over Facebook to get the newcomer refugee seekers integrated into local community. Nearby residents were acting as hosts and refugee seekers were guests performing different cultural and sports activities. Together.

Empathic design aims at establishing empathy between different actors involved to service provision and development with its visual, tactile, experience enhancing and playful ways of making. Such methods can help stakeholders to avoid abstractions and make discussion more concrete. Empathic approach also aim at building trust and better understanding of sometimes-opposite opinions towards more equal partnerships. Typically different approaches are used to understand and design for service users' experiences. For example, Vaajakallio et al., (2013) adopted co-design workshops and generative tools, such as image collages and design games, narratives, and customer journey boards when designing for public services. These tangible tools and props helped non-designers and people from the public sector to envision and articulate what could be desirable in the future (Vaajakallio et al., 2013). Vaajakallio et al. (2013) suggest that adopting an empathic approach, i.e. building on service users' experiences, processes and practices open opportunities for solutions over more traditional approaches. Hence, designers act as a bridge between different participants' views and help them to create their own ideas instead of giving them direct solutions to evaluate or choose from. However, based on the case studies the authors recognised that it is important to have a change agent (e.g. designer) in the organisation to ensure the implementation of these -sometimes radical- solutions. Recently, the empathic approach has been applied in the context of supporting collaboration in networks. Tools for exploring the systems perspective include for example, communication maps, modelling networks, customer journey mapping and service blueprinting (Stickdorn; Schneider, 2011). These tools can be used in various contexts and phases during the design process. For example, Kronqvist et al. (2012) used customer journey map as basis for a game board. The aim of their project was to develop new services in hospital context and the game board was used for supporting interviews with patients and employees. The game board acted as a design medium to express very personal and sensitive experiences about the current service.

2.2 Transforming service organisations through service design

Existing public services can be seen as products of the current organisational structures that have developed during past decades. Now as the public services are facing the needs for change, also the organisational systems behind the services need to change. For example, Junginger and Sangiorgi (2009) argue that services cannot be isolated from the elements of the organisation. According to them these elements include the people with their norms, values, beliefs and behavioural patterns; the structure of the organisation such as its procedures, hierarchies and tasks; its resources and an organization's vision, which gives purpose and guidance for how resources might or might not be used (ibid). Junginger (2006, 26) presents three ways to organisations to change; drifting, accommodation and transformation. According to Junginger (2006, 26) drifting denotes to passive change linked with the past, accommodation is responsive change to present circumstances, and transformation targets the future of the organisation. Transformation is more profound than drifting and accommodation; during the transformation values, assumptions and beliefs inside the organisation change (Junginger, 2006).

Previous research has recognised the need for more continuous development based on the bottom-up insights (e.g. Bason, 2010). For example Sørensen et al. (2013) investigate the organisational conditions for service encounter based innovation, during which ideas and new practices are developed and integrated in the organisation based on frontline employees interactions with users. Sørensen et al. (2013) pose a question how organisational features may facilitate such innovation processes? According to Sørensen et al. (2013, 1448) *"the service encounter-based innovation processes depend on three general interdependent elements of an integrated process: (a) facilitation of the innovation process by organisations, especially in order to sustain (b) creativity among front-line employees based on service encounters and (c) integration of the results of the creative processes in the organisation."* Organisational support system can support communication and integration of front- and back offices, as well as facilitate "creative front-office innovation climate" (Sørensen et al. 2013, 1448). Support system may facilitate the transfer of ideas from frontline employees to back-office. For instance, it can support processes through which back-office acquire and handle the customer insights and practice-based changes in the front office. What role design process and methods can have in this kind of organisational support system? According to Deserti and Rizzo (2014, 42) *"design challenges the natural organisational attitudes of preservation and resistance to change, generating a constant tension between the search for innovation and the necessity of relying on established ideas and solution"*. They see these contradictions as the sources of change in all situations in which innovation overcomes the constraints to its own development by generating new artefacts, knowledge, beliefs, processes, structures and technologies that become part of the organisation by modifying it (Deserti; Rizzo, 2014, 42). According to them the constant tension between the development of new products and the organisational attitudes of preservation and resistance to change builds a significant link between design and the problem of managing organisational change (Deserti; Rizzo, 2014, 36). In their opinion design introduces bottom-up perspective to organisational change (Deserti; Rizzo, 2014, 36). The development of new kind of services implies

relevant changes in all the elements that compose the organisation. Thus, bottom-up perspective assumes that designing significantly new solutions may bring unexpected changes in the organisation because contradictions might arise between the current culture and the one needed to implement the new solution (see also Deserti; Rizzo, 2014, 37). Also Junginger and Sangiorgi (2009) reflect on the potential of service design to generate and implement internal changes within an organisation. They suggest that successful and sustainable new services, which aim for lasting transformations, require reflective inquiries into organizational systems (Junginger; Sangiorgi, 2009).

Junginger (2006; 2009) investigates the human-centred product development process as a way to enhance organisational change. Junginger (2009) advocates the notion of designing outside-in as key to organizational change. According to her human-centred design process introduces the perspectives and experiences of people outside of the organisation (e.g. customers and suppliers) to the organisation. These people are not familiar with acronyms, processes, hierarchies or standards created by internal experts (Junginger, 2009, 235). She states that as the design process is an activity of making and creating, the learning is put to action. Learning and acting on the learned are necessary preconditions for fundamental organizational change (Junginger, 2006, 15). Furthermore, this process may also give people confidence in making decisions and taking actions (Junginger, 2009, 235). She sees human-centred product development as a path for organizations along which they can transform themselves. Thus, this process of designing from the outside makes organizations and their products work for people inside and outside of the organization. There is also a need to understand the changing customer needs continuously and act according the findings simultaneously (e.g. Bason, 2010). Junginger (2006, 17) states that her findings document that human-centred product development cannot only generate the possibilities for organizational change but also offer the means to implement them. Design offers tools for exploration, visualisation, iterative prototyping and testing. Thus, design outcome may also give a concrete form to what is uncertain and undetermined between the organisation's vision and the user insights, in other words combine the top-down and bottom-up approaches.

To summarise, design has been recognized as a potential approach for combining the top-down and bottom-up approaches in service development. For example, design can have inevitable role in organisational transformation by exploring the organisation from the outsiders perspective e.g. customers' or partner organisations' employees' perspectives. Design process can be seen as an inquiry to the organisation and as a vehicle for organizational change (Junginger, 2006; Junginger, 2008). Design tools and processes can support continuous front-line employee and customer-based service development, for example by enabling organisations' to see the strengths and weaknesses of the organisation from the outsiders' perspective. Employing methods familiar to design such as co-design workshops and generative tools, such as image collages and design games, narratives, and customer journey boards and prototyping, can be used to enable organisations to learn about their customers and about themselves.

3 Case studies: Combining organisational and customers' perspectives

In the following paragraphs, we introduce two cases. Both cases focus on gathering, analysing and visualising experiences of different stakeholders (e.g. managers, frontline employees, customers) involved to service development, provision and use. Cases illustrate what kind of needs and challenges exploration of new service solutions may face in public sector and how the design tools may help to overcome those obstacles. First case concentrates especially to the organisational perspective and the second to the customers' perspective. Analysis focus to three themes: 1) needs and barriers for novel approaches for develop public services from organisations' and customers' perspectives, 2) experiences related to the inter-organizational customer journeys from the customers' perspective, and 3) the role of design in enhancing and combining the top-down and bottom-up service development approaches. These cases are used as examples how design has been used for developing public services and organisations providing the services.

3.1 Case 1: Designing for organisational transformation in inter-organisational service network

The first case study focuses on the collaboration within and between organisations during two successive projects. The first development project took place 2010-2013 and the second on-going, evaluation project takes place 2013-2014. The aim of both projects is to facilitate customer-centred inter-organisational collaboration in context of services for elderly living at home. The aim of the municipality-initiated development project was to create local, customer-centred service network from public, private and third sector organisations to support elderly citizens living at home. The focus of the project was especially in the caregiver families living at one neighbourhood at Helsinki metropolitan area. The focus of the on-going evaluation study is on assessing the role of design during the development project. The evaluation is based on the experiences of the employees (e.g. frontline employees and managers) involved to the service development and collaboration during the first project. In addition the on-going project aims to develop tools for modelling complex networks and prototyping new collaboration possibilities within and between the organisations in the network. Some of the findings are reported also in previous papers related to the projects (e.g. Nykänen; Jyrämä, 2013; Hyvärinen et al., 2014).

3.1.1 *Methods: Gathering the experiences on design through interviews*

Preliminary findings presented in this paper are based on interview data and project materials, such as reports, memos and presentations produced during the projects. Interview data was gathered through semi-structured interviews with different service network actors. Interviews took place in the spring 2012 when the development project was in midway. A design researcher working in the project carried them out. Altogether 16 employees from public, private and third sector organisations were interviewed: twelve employees from the public sector (e.g. social services department, health care department, city's central administration), two persons from the private sector, and two persons from the third sector. The selection of the interviewees was based on snowball sampling. First part of the interview included questions related to the project preparation, interviewees' role in the project, and experiences of the collaboration during the project. The second part of the interview focused on the role of design and how interviewees perceived it. Each interview lasted from one hour to one and half hours. Transcribed interview data was analysed qualitatively. Analysis focused on identifying themes related to the collaborative intra and inter-organisational service development efforts and use of design during the development project. The materials produced during both projects were used to gain more holistic understanding about the projects and to support the interview analysis. Project materials were acquired from the archives of an organisation that participated to the first project. However, the findings presented in this paper focus especially on individuals' insights and experiences as expressed in the interviews. The interview quotes presented in this paper were translated into English by the one of the authors.

3.1.2 *Findings: Engaging people to the transformation through design*

Especially public organisations were structured to provide standardized service for all citizens interdependent what customers really needed or wanted. The organisations were organised according to functional silos and there were no established practices for collaboration between different units and departments. From customer perspective this led inefficiencies and breaks in communication, coordination and information sharing. This was especially evident during the customer journeys that spanned across organizational boundaries and across different channels. According to the interviews, employees from the public sector have recognised that the elderly customers struggle to manage the interrelated social and health care services. At the time of the interviews, none of the service providers had holistic view to the services provided for a specific customer. Thus the customer was responsible for the communication, coordination and information sharing between different service providers. However, all interviewees had recognised that fluent collaboration within and between organizations would result better service from customer's perspective and resource savings from organisations' perspective. One problem in the public organizations was that the customer insights and frontline employees' knowledge about the customers reaches the management level only randomly.

The hierarchical organizational structures did not support the bottom-up insights and innovations to be systemically utilized in service development. Furthermore, the hierarchical structure and bureaucracy reduced employees' and customers' opportunities to participate to the service development efforts. According to the interviews, also the management level understood that the organisation-driven way of providing and developing services was not producing required kinds of results. The development project was strengthening their opinion, that bottom-up approach was only way to provide services that really benefit the customers. Especially in case of the elderly citizens, right kind of support may prolong the time they are able to live at home. This kind of personalised support can only be provided by understanding the customer's everyday life, providing right kind of service ensembles and enhancing the collaboration between different service organisations. As one interviewee stated, the customers' are not really interested in the back stage processes and who provides the services.

Developing collaboration from the customers', not organisations' perspective, calls for tools for gathering and sharing customer insights continuously. Transformation of beliefs, values and attitudes can be enhanced by enabling employees to look their own organisation from outsiders, for example from customers' perspective. Thus, the organisations need to be more proactive with the bottom-up insights, and therefore the organisational structures need to be updated to support this kind of processes. However, the interviews revealed barriers for transformation as illustrated next. According to the interviews the public organisations lacked feasible tools for gathering bottom-up insights from the citizens and the employees. In addition they lacked organisational structures and procedures for implementing the findings in their everyday service operations. However, the development project was seen as a platform for developing and testing these kinds of tools and practices. The process of gathering customer insights and developing and piloting novel service concepts based on them, catalysed also the transformation in the organisations. The project involved customers and other stakeholders from outside the organisation and enabled the learning among the people inside the organisation. Furthermore, the project was seen as an opportunity to question the traditional ways of operating.

Interviewees recognised that design may have different roles in enhancing organisational transformation. For example, the designerly way of gathering, visualizing, analysing and sharing information enhanced more holistic and user-centred service development. Various design methods were used during the development project. The methods included contextual interviews, design probes, personas created based on the gathered customer insights, co-design gatherings, and creating service network visualisations and customer journey maps. The design probes were used for collecting information about the elderly customers' everyday life. Bottom-up insights were collected through interviews. Service design consultants conducted contextual interviews with the caregiver families in 2011. They created personas describing the typical user groups, based on the interviews. In addition they shared the customer

insight with video clips for example in workshops arranged to different stakeholders of the project. The co-design workshops were arranged to share and analyse information and ideate new service solutions together with different service network actors. According to the interviews especially the customer video clips showed in the meetings had a great impact to the management level in the organisations. Also the customer journey visualisation and service network maps were used as a basis for discussion in the workshops.

Design tools and approaches were appreciated especially because of their ability to bring people together and thus combine the bottom-up and top-down approaches. For example visualisations helped different stakeholders to share and analyse collected insights. The design probes were used during the development project for collecting knowledge about the customers' everyday life and service needs. The first version of the probes package was designed and implemented by a design student working in the project. According to the interviews even front-line employees, who had worked with the customers for years, got new information about their customers through this method. Interviewees also recognised that a design process can bring change to the organizations regardless of the results of the process. For example, the workshops were seen as important platforms for people to meet and vision for the future collaboration opportunities. Co-creation took place in the borders of different expertise and practices, as one interviewee from the private sector stated the workshops presented the challenges and opportunities of this kind of collaborative service development setting in a miniature size. However, design did not provide only tools for learning through exploring the future possibilities but also implementing them through iterative prototyping. The main outcome of the design process might be new knowledge about the own work and organisation as well as opportunity to get familiar with people inside the own organisation and from other interrelated organisations. Service prototyping and piloting processes enabled different level employees from frontline to management to think about their own organisation in a new way.

3.1.3 Discussion: Towards continuous organisational transformation in all levels

The preliminary findings indicate that in 1) the current organisational structures and decision-making procedures need to change to support combining of the bottom-up service development to current service development practices, 2) thus, the organisations are in need for new feasible tools for enhancing continuous collaboration inside the organisations, between the organisations and with the citizens, and 3) the designerly way of gathering, visualizing, analysing and sharing information enhance both bottom-up approach and developing practices for combining bottom-up and top down approaches.

The elements of the organisations, such as the employees; the structure of the organisation; its resources and the organization's vision (e.g. Junginger; Sangiorgi, 2009) have an important role in facilitating the creativity as well as integrating the results of the creativity. It seems that especially in the public sector, bureaucracy and current decision-making routines hinder the information generation and sharing about users' needs and limits responsiveness to these needs (e.g. Sørensen et al., 2013, 1448). Thus design process must involve different units and departments and possibly take into consideration ideas, experiences and the knowledge of employees from all levels of the organisation. Continuous service development can be achieved by integrating the front-line employees' work-related experience and by supporting bottom-up knowledge sharing. Internal barriers such as current divisions between front-line employees, management and research and development units, can be seen as a barrier to bottom-up service development. According to Sørensen et al. (2013, 1448), such internal organisational barriers may also consist of cultural, social and/or psychological 'divisions' between front- and back-office work-groups. Design methods can enhance the understanding between the 'silos' of the organisations and across borders of different expertise. Furthermore, design tools, such as prototyping, may help to collaboratively decide whether or not to develop an idea further by making abstract service concepts more concrete.

The findings presented in the previous section form a basis for the on-going modelling and prototyping process of the on-going follow-up project. Future research directions include modelling and prototyping the future collaboration possibilities together with stakeholders from different units and organisations. Service prototypes and the iterative prototyping process are used as a shared platform for discussion about the current situation and future possibilities. Especially aim is to prototype different communication, collaboration and information sharing practices with-in and between different organisations from the employees' and customers' perspectives. Aim is to enhance the sharing of customer insights within and between the organisations and support the organisations capacity to facilitate the frontline employees' service encounter based idea creation. This entails also changes in the organisational processes and structures since the back-office processes need to facilitate creative problem solving in service encounters and observing, recognising and accepting changed practices, which can then potentially be distributed and reproduces as innovations (Sørensen et al., 2013, 1448).

3.2 Case 2: Standing into someone else's shoes

The second case study focuses on mapping and visualising immigrants' service experiences throughout service journeys by using touch point cards and emoticons. This preliminary study was conducted to investigate state-of-the-art of public services provided for immigrants when relocating in to Finland. To do that informal interviews with the service users - immigrants and the service providers – the City of Helsinki employees were conducted. The aim of this study was to gain understanding of the immigrants' everyday life and how people with different cultural background use services

specifically related to their relocation. For example, acquire the residence permit by registering at the local police station, obtain health insurance card, finding a job or learn local language. Series of seven interviews with university level educated immigrants and two with civil servants working on immigrant services were completed.

Interviews were conducted from mid January 2014 to the end of April 2014 in English language and they lasted from 40 minutes to one hour and a half. Interviewed subjects (two men and five women) represented immigrants coming from Japan, Slovenia, Russia, China and Afghanistan. One participant had the status of the refugee and two had individuals Swedish/Finnish descent who were born outside Finland. Interviews with the immigrants were conducted at the university campus, apart two from which one was done at the participant's home and the second one at the adult language centre. Five participants were recruited from the university, two from the language course and one over the marital relationship. Interviews with two (female) civil servants were done at the City of Helsinki premises.

3.2.1 *Methods: Mapping and visualizing services journeys*

Visualisations of service journeys included services that interviewees used before, and after moving to the country nevertheless, they have not been asked about other public services (for example doctor or library visit). Interviews with civil servants were conducted as standard informal interviews, and no additional (visual) material was adopted. Customer service journey visualisation used with immigrants acted as a boundary object to discuss issues related to services and to establish more informal relationship between the researcher and the immigrant. The researcher asked immigrant beforehand to think of its favourite object that reminds him/her of home country. Telling the story behind the chosen object acted as icebreaker and in many cases made participants very emotional. After that the participant was asked to map out their service journey with the use of touchpoint cards and big, blank sheet of paper. To do that the participant was given a set of touchpoint cards (including blank ones) representing an image and word of service touchpoint (e.g. police, bank, the registration office). The interview followed four themes: before moving to country, coming to country, interaction with the service and integration (if it happened). In addition, the participant was given a set of eight different emoticons – visual representation of different facial expressions (for example smile or frown) to express their experiences and feelings when were using different services, service encounters or service touchpoints. In order to get, more compelling story the researcher was asking participant prompt questions such as, *“How did you feel about that?”*, *“Where did you go next?”*, *“What happened then?”* through the interview.

3.2.2 *Findings: Service journeys paths between different service providers are incomprehensible for everyone*

This section discusses issues that they were pointed out by immigrants' service users, together with the City of Helsinki civil servants employed on immigrant services. Findings reveal five issues concerning immigrant services.

First, inadequate intra-organisational and inter-organisational collaboration between different immigrant services providers' organisations was reported. Interviewers were stressing out non-transparency of the system and poor communication. Settling in obligations, which are required to be completed by the individual immigrant are in several different locations in the city. Furthermore, the civil servant reported that different service encounters provide only the certain types of services and they have limited competence *“We used to have Infopannki website [this is often the first informative website for immigrants], but it is not interactive. Then we have Virka office [face to face support for immigrants provided by the City of Helsinki], but they don't make any decisions, they only give advice and ‘In to Finland’ [tax office information point] they can give you only tax number.”* In addition, individual service encounters act as independent bodies (e.g. registration office) and they are able to undertake autonomous decisions in different parts of the country. This contributes to further incoherency and reduced communication between different service providers' organisations (e.g. registration office, police, tax and health insurance office) in immigrant services. Moreover the civil servant reported that in order to centralise all immigrant services in one place, it was planned to place at the City of Helsinki in person immigrants support, tax office information point and the national healthcare office, nevertheless because the city is providing services for all residences that were not possible.

Second, more holistic understanding on how the service system works. Individual user's service journey paths are incomprehensible to both service users and immigrant services providers' organisations, which are not familiar with the most appropriate paths for different types of service users. Immigrants coming to Finland are mainly divided into three different categories: EU, non-EU and third countries citizens. However, their service journey differs if they are students, married to the Finnish person, labour immigrants, or they are coming from Nordic countries. The civil servant reported that it is unclear what service journey path certain type of immigrant has to take *“the problem is that this is really unclear, but for us as civil servants we can map out [service journey] here and there, but from the user point of view, it is a jungle”*. Similarly service users reported the lack of understanding on how the Finnish immigration system works *“Maybe because of my language barrier or lack of understanding of system living in the social state, I still don't understand how things works and what to expect of certain services.”* Furthermore, the reason why they have to visit the particular service encounter is not reasonable to the service users cultural background *“You have to go to the police office and you have applied there, which is really the strange combination. Why we have to go to the police office, already you sound like criminal. I don't go to these places regularly.”*

Third, service users reported complicated and unclear procedures and protocols with rigid rules and no alternatives, which they made them frustrated. Complicated service encounter procedures cause task duplication for service users. For instance, the person can apply for the residence permit online, but then has to go to the police office to prove its identity in person. Moreover, the procedures are rigid and they are not an necessary offer any alternatives or taking on board already established similar services protocols. Service user reported the following incident: *"I went to the bank and they said 'We can't give your electronic identity because you don't have ID card', I said 'I can confirm my identity with my passport.' In our rules, you have to have ID card."* Complex and demanding procedures cause long waiting queues and uncertainty at the service users not knowing how long the process will take. The case was illustrated with the following user's words *"Did you not receive any letter?" I said no, no letter, no e-mail, nothing like that, no notification. She was ashamed. "Actually, it is ready, it was ready already in December." What? So they didn't notify me about that at all and I spend two months in uncertainty. So, by that time service didn't work. That is what I can say. I was not angry, I was just happy that is ready. But I was little bit upset that they did not notify me."*

Fourth, touchpoints' information incoherency was reported, for example lack of integration between different channels e.g. websites, non-informative personal communication, written correspondence available only in local language and insufficient spatial communication. Service users as misleading, difficult to understand, badly maintained reported websites, which are often the first contact point with the service; they felt confused and frustrated. For example, the service user reported the following occasion at the embassy *"Ooo, my got it was so complicated and the thing is that I checked the website then, I decided to call because, it was not clear. They had so weird website and beside that it was in Hungarian. So, I call them. I didn't cry I was like... I was angry."* Furthermore non-informative personal communication was identified by service provides and users. The civil servant reported, *"What I am hearing from the people that they are trying to settle down... Finnish offices have the tendency only to reply the questions that you ask; they don't give you the additional information, [] for example, what is the next step that you have to do...."*

When visiting the public place (e.g. the police office) immigrants expected information in different languages and clear spatial communication, but this was the case. User reported the following experience *"When I went there it was so unclear where you have to go.... They have one big room and another big hall with electronic view and all that stuff. And, I went there first and everything was in Finish and something about fire licenses and all these strange stuffs. Ok, they don't have anything the like information desk, someone who can explain to me where to go. I take that long queue just to ask."*

Fifth, social platforms and peer-to-peer guidance were seen as important when users proposed improvements. Overcrowdings of current immigrants' services and huge apparatus require from future public services to think of providing alternative peer-to-peer services, as a support to existing public services, which can substitute special needs of different profiles of immigrants.

3.2.3 Discussion: Development of peer-to-peer support services as a alternative to existing public services

This preliminary study designates 1) inadequate intra-organisational and inter-organisational collaborations between different service settlement services providers, 2) more holistic understanding of how the service system works, 3) complicated procedures and protocols with rigid rules, with no alternatives 4) touchpoints' information incoherency, and 5) social platforms and peer-to-peer guidance.

Current inter-organisational immigrant services structure needs more transparency and better communication between different service providers or centralisation of the services in one place for different types of immigrants. More user centred approach (bottom-up) is needed, as existing system not necessary fit to immigrants' needs as is developed more for home residents. This bottom-up approach need to be facilitated by the back-office, thus transforming the current traditional organisation structures is needed (e.g. Sørensen et al., 2013). For example, home residents get social security number by birth and the entire system base on that. Immigrants struggled to get this number. Furthermore, current governmental service structure is silos oriented and understand immigrants thru their employment, housing, health, and social care rather than as individual person with its specific cultural background, life-story, skills, knowledge and needs.

Complicated service journeys paths between different service providers require implementation of design thinking via visual representation of user actions points, service journey maps and different immigrants' profiles based on latest legislations. This will help both service users and providers for more fluent service navigation through settlement services user journey. Furthermore, implementation of design thinking in system and service design or even more radical "designer in residence" can smother complicated procedures and protocols. Service design with its empathic service design tool can visualise and examine separate touchpoint and contribute to more informational coherency.

Botero et al. (2012) are observing flourishing new citizens' lead event initiatives and urban planning development plans. Relationship with the citizens and the state is changing; it is necessary to imagine and organise common affairs in new ways. The authors notice intension in developing new partnerships between public, private and third sector and citizens to create and produce more public services. Active forms of citizenship, broader public participation, and the role of 'peers' have emerged as key issues (ibid, p.6). Botero, et al. (2012) recognised different types of alternative peer-to-peer services arising from people initiations as well as non-profit and non-governmental organisation. The findings also triggered new questions, such as is the design process about implementing a current strategy or re-

inventing the strategy? Who defines that what is developed, how it is developed and how the process and end result is implemented and evaluated? We are planning to address these questions in our future research.

4 Discussion

The two cases presented above illustrate how design can be utilized on different levels of organisations for developing public services and transforming the organisations providing the services. The literature on design in context of organisational transformation recognised the design process as a way to renew the organisations from inside-out and outside-in. The literature on design emphasised the role of design in supporting collaboration between various stakeholders with different backgrounds. Especially design methods were appreciated because of their ability to bring customers' perspective inside the organisations. In addition to the novel ways of gathering and sharing customer insights, also the collaborative settings in the workshops enable novel relationships between stakeholders to emerge.

The following table (Table 1) summarizes the findings from the case studies and the literature.

Table 1. Development needs identified from the literature and cases and suggestions about the role of design.

Identified development needs	Suggestion for the role of design
Need for continuous inter-organisational collaboration and holistic understanding how the service system works. People that are part of the system and the people who are using it are not aware about the different actors and their relationships. Need to move from random development projects to a conscious and systematic approach to public sector renewal (Bason, 2010).	Collaborative system mapping through visualisations (e.g. actor maps, communications maps) make the abstract service system visible. Develop feasible tools for enhancing continuous collaboration between organisations in different scales and levels. Design tools (such as design probes, visualising customer journeys, story telling over video about daily life of users) enable new ways to gathering and sharing customer insights.
Need for continuous organisational transformation. Organisations are not customer-oriented but working in 'silos'. Insight from frontline employees and customers don't reach the management level. Organisational structures need to support Implementation of bottom-up innovations. Organisations lack tools and procedures for collecting and sharing the front-office insights and using them as a basis for continuous development (e.g. the lack of communication between front and back-offices, lack of back-office support for the creative attitude in the front office).	Introduce the perspectives and experiences of "other" people to the organisation (Junginger, 2009) for example by applying tools for understanding the everyday practices of customers and service employees (e.g. contextual interviews, design probes). Develop feasible tools for enhancing continuous collaboration inside organisations and with the service users. Support innovation capacity at all levels of organisations (Bason, 2010). For example, apply design process and tools for lowering the borders and enhancing the understanding between different organisational or expertise 'silos'. Apply design tools to make abstract service ideas more concrete (e.g. scenarios, prototyping) to enable discussion and evaluation of the ideas before implementing. Create organisational conditions for combining the top-down and bottom-up approaches for example by providing platforms for collaboration (e.g. co-design workshops, design games).
Need for clear and smooth procedures and touchpoint information coherency. Complicated, unclear procedures and protocols with rigid rules, which do not allow any alternatives. Incoherency between different touchpoints within a service journey (e.g. lack of integration between different channels) e.g. spatial communication, frontline employees are not providing information, written correspondence available only in the local language.	Clear visualisations of procedures and protocols in multichannel information delivery. Mapping the service journeys from the customers' perspective, mapping the different channels of communication of certain service provider, to form coherent multichannel customer journeys.
Need for visual and tangible tools complementing the traditional verbal communication. Support communication between service users and service providers.	Design is not just about providing solutions to specific problems, but providing organisations with the tools and capacities for human-centred service innovation (Sangiorgi, 2011). Introduce visual tools for easier communication and collaboration during the service encounters (interaction between the frontline employee and the customer) and service development (between different stakeholders) (e.g. customer journey visualisations, service system maps) For example tangible tools and props help non-designers and people from the public sector to envision and articulate what could be desirable in the future (Vaajakallio et al., 2013). Design can give a concrete form (e.g. prototype) to what was uncertain and undetermined between the organisation's vision and the user insights (Junginger, 2006).

Identified development needs	Suggestion for the role of design
Need to overcome the resistance to change. Employees at all levels of the organisation need to be encouraged to be innovative in daily basis. Support creativity at all levels from frontline employees to management. Need to support transformation process (learning) where the values, assumptions and beliefs inside the organisation change (Junginger, 2006).	Design tools support processes of co-creation, creating new solutions with people, not for them (Bason 2010). Designing can be seen as tool for exploring problems, not just part of problem solving that begins after a problem has been defined (Junginger, 2013). Designing new solutions also challenges the natural organisational attitudes of preservation and resistance to change, and provides tools for exploring the contradictions that might arise between the current culture and the one needed to implement the new solution (Deserti; Rizzo, 2014). Design process can involve all levels of the organisation, and this involvement supports transformation of attitudes, values and beliefs. Designer may act as a bridge between different participants' visions and help them to create their own ideas instead of giving them direct solutions (Vaajakallio et al., 2013). It is important to have this kind of change agent in the organisation (e.g. Vaajakallio et al., 2013). Embedded designer can be responsible for developing organisational design capacity and specific service redesign programmes (e.g. Helsinki Design Lab) (Design Commission, 2014, 31)
Need for more peer-to-peer support. Alternative service solutions provided by the community.	Alternative forms of peer-to-peer support complementary to current governmental services (e.g. Botero et al., 2012).

5 Concluding remarks

This paper has illustrated through literature and two case studies how design can be used for enhancing organisational transformation that may result to more effective and efficient public services. Especially public sector is in need for new approaches to develop their services continuously to be able to survive from the difficult economical situation. Design can help the organisations to transform in various levels by providing tools for collaboration and for the individuals to be more active in developing their own daily work. In this framework design is seen as a way both explore the organisations and change it simultaneously and continuously. Design is a way to put things into the places.

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Evaluation of services linked to the sustainability: a dynamic and multi-criteria approach

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The purpose of this paper is to study the challenge of the evaluation in the context of the services in the sector of environment and energy. Because of the specific nature of service innovation the traditional evaluation methods and measures are not able to capture neither the diversity of the innovations nor the multifaceted dimensions of performance. This paper aims to contribute to the need for a more diverse evaluation approach. We study the use of multi-criteria and system dynamic perspectives in the evaluation of services, and we develop a new type of methodology to evaluate their dynamics and multifaceted performance. (10 lines max)

1 Introduction

The focus in the definition and the evaluation of innovations has typically been on traditional S-T indicators orienting highly towards their technological and economic aspects. This approach has been criticized in the service studies (e.g. Djellal & Gallouj 2010, 2013; Toivonen 2010; Rubalcaba et al. 2012). Because of the specific nature of services, especially their immaterial and interactive dimension, the traditional evaluation methods and measures are not able to capture neither the diversity of the innovations nor the multifaceted dimensions of performance in the sector (Djellal & Gallouj 2013).

The increasing “servitization” of society has also put pressure to develop a more advanced approach to evaluation and in some recent studies (e.g. Djellal & Gallouj 2010, 2013; Rubalcaba et al. 2012), both the “plurality of methods” (Dyehouse et al. 2009; Williams & Imam 2007) and the basics for new evaluation criteria have been suggested. According to them, impacts should be assessed on the basis of a multidimensional approach to take into account their aspects of quality, reputation, social innovation and social value (Djellal & Gallouj 2010, 2013; Rubalcaba et al. 2012).

Systems thinking have often been applied hand in hand with these views. Reasoning is rooted in the modern “broad view on innovation” that highlights the interactivity (including multiple sources and actors in it), complexity and uncertainty of development and implementation of innovations. These arguments and perspectives affect both to the definition of innovations and to the evaluation of their effects and impacts (e.g. Kline & Rosenberg 1986; Lundvall 1992; Freeman 1991; Nelson & Rosenberg 1993; Dosi 1999). And it directs to consider the dynamic nature, interrelationships and feedbacks between multiple actors within the process (Smith 2000; Edquist 2005; Cabrera et al. 2008).

The evaluation challenge concerns especially services that are linked to the sustainability and environmental issues. In such services, the technological perspective (especially “end-of-pipe” technologies) typically dominates discussions. However, the most urgent problems in the present society cannot be solved via the development of individual technologies or services. Instead, the focus is in service solutions which can be characterised as complex innovations integrating technological, non-technological and service-based elements and developed and implemented in the interaction with various actors (e.g. Djellal & Gallouj 2013b). The emerging role of service solutions is not sufficiently taken into account (Djellal & Gallouj 2010, 2013) in the current evaluation approaches.

This paper aims to contribute to the above described need for a more diverse evaluation approach. The objective in this paper is *firstly* to study the system perspective and the evaluation challenge in the context of service innovation and *secondly* to develop a new type of *dynamic multi-criteria evaluation* approach. Suggested approach integrates the multi-criteria perspective (Djellal & Gallouj 2010, 2013) and system dynamic modelling (Sterman 2001). In the methodology multi-criteria perspective describes the various impacts by giving insight to different societal spheres and their principles and values in the sens of Economics of Convention (Gadrey 2005; Djellal & Gallouj 2010, 2013). System dynamic modelling pays attention to the interaction of various actors and their values in the evaluation situation (cf. Giddens 1987) and provides information how the system structure creates complex dynamic behaviour over time. It helps to explain the role of feedback loops between different actors and factors that promote or hinder the emergence of impacts.

The following research questions are guiding our work:

- How and by what means should the outcomes and impacts be evaluated in order to take into account the multifaceted and dynamic nature of service innovations in the sector of environment and energy?
- What are the dynamic impacts of service innovations in the sector of environment and energy?

As a result of our study we provide a two dimensional approach to evaluate the impacts of services. The focus is in understanding the dynamics of service creation in the environmental sector and the use of evaluation methods and indicators in it. At more detailed level, our study provides analytical material about complementarities and contradiction

between different indicators. The results will illustrate how the technical and non-technical aspects of service innovations interact in the area of sustainability.

This paper is divided into three sections. The second section after this introduction is based on literature and discusses the current evaluation challenges in services. The third section presents the two main perspectives that we apply in our framework to evaluate the services. In the fourth section our case study context and methodology are described. In the fifth section we present the application of our frameworks and present the main results of our study. Final section sums up the discussion and makes the concluding remarks.

2 Theoretical background

2.1 System approach to services

The current social, economic, and environmental challenges are too big to be solved via individual product and service innovations created in individual organizations. Conversely, the challenges require various innovations and simultaneous development of organizations, technologies, services and multiple network relationships (Gallouj 1994, 2002; Windrum and García-Goñi 2008; Harrison et al. 2010; Rubalcaba et al. 2012). A crucial question is how to combine various innovations effectively and disseminate them rapidly on the basis of continuous interaction of different organizations. In other words, examining and developing innovations at the systemic level has come to the fore.

While innovations are increasingly combinations of many technologies, organizational changes and services, they are also embedded in a wider social environment which supports or restrains the development of new innovations. This wider context could be described as socio-technical system in which radical changes take place only rarely due to such phenomena as “path-dependency” and “lock-ins”. These concepts refer to the fact that past decisions and choices may steer and restrain new developments. Wide socio-technical change based on radical innovations becomes possible only if system faces e.g. a performance crisis which is not possible to solve with incremental improvements. In essence, a wide change requires complex interaction between actors, resources, institutionalised practises and regulation in a system. (Geels & Schot 2007; Geels 2004; Geels 2002) This means that we need a more systemic view and system oriented methods when we are assessing the dynamics and performance of the system. The focus on separate service or technological innovations needs to be replaced by a wider view taking into account the context and its complex interactions.

This kind of view is emphasized in recent studies on innovation ecosystems. The idea of innovation ecosystem emphasizes the idea of a system of various actors with mutual dependencies and causal linkages. For some writers the concept means innovator-distributor-retailer-end customer relationships and how the innovator/producer is dependent on other firms in its innovation and market activity (e.g. Adner 2012). Some other writers replace the whole concept of innovation system with the concept of innovation ecosystem (e.g. Heller 2013). The more elaborated versions of the concept refer to systems theory and use such concepts as co-evolution, co-specialization and co-opetition (Carayannis & Cambell 2009). In here we suggest that an ecosystem is a multi-actor and co-evolving system of private and public actors working together to create economic and societal advantage.

2.2 Evaluation challenge in services

For two decades, service studies and specifically the studies on service innovation have argued that the traditional tools, indicators and measures do not capture the performance, innovativeness and impacts in services (Sundbo 1998; Metcalfe & Miles 2000). A central background reason for the existence of the gap is the “assimilation” perspective adopted in the early service research (Coombs and Miles 2000; Gallouj 1994). This perspective analyzed services innovation as an imitation of technological and manufacturing innovations. The perspective was based on the traditional definition of innovation as an invention which results from an R&D project (Howells 2004). The linear, stage-gate model of an innovation process, which was raised to the position of a norm and marketed as a prerequisite for success (e.g. Cooper & de Brentani 1991), increased the bias.

These arguments and perspectives have been developed in the context of service innovations. However, they are strongly rooted in general innovation theories basing on the Schumpeter’s definition of innovation that has afterwards been regenerated to “the neo-Schumpeterian” theory of innovation or a broader view of innovation (Lundvall 2007; Toivonen 2013). These traditions are interlinked by several common aspects that affect both the definition of innovations and evaluation of their effects and impacts. Important cornerstones are complexity and uncertainty of innovation process, intangible nature of innovation (focus in new solutions and processes) and systemic view of innovation encompassing multiple sources and actors taking part into the innovation process. (Kline & Rosenberg 1986; Lundvall 1992; Freeman 1991; Nelson & Rosenberg 1993; Dosi 1999). Also from the perspective of general innovation literature conclusion has been parallel: current practices in defining innovation and evaluating them do still follow the mainstream linear innovation thinking which simplifies too much the innovation process as well as the complex dynamics between actors contributing innovation (e.g. Smith 2000; Arnold 2004; Edquist, 2005; Smits & Kuhlmann 2004; Djellal & Gallouj 2010, 2013; Patton 2011).

In addition to the narrow view on innovation, the dominating view on performance is also mechanical and narrow. It is usually linked to the concept of productivity which refers to the linear and mechanistic input-output function (e.g.

Djellal and Gallouj 2010, 2013; Kellog foundation 2004; Patton 2011). Its' traditional definition is unable to recognize the "hidden performance" concerning the societal aspects of services and innovations like equality, ecological sustainability and societal well-being. It also often excludes the aspect of social innovation (e.g. Rubalcaba et al. 2012). Djellal and Gallouj (2010) have described the interaction between performance and innovation by referring to the visible vs. invisible nature of this phenomenon. Whereas technology-based innovations are visible, non-technological innovations are invisible. As regards performance, the authors link the visible-invisible dichotomy to short-term vs. long-term influences. Both in scientific and the managerial discussions, short-term influences of performance are often analyzed in terms of productivity and growth. Longer-term influences are increasingly analyzed in terms of environmental or social sustainability. There are four possibilities in the relationship between innovation and performance as Figure 1 illustrates (ibid., 668).

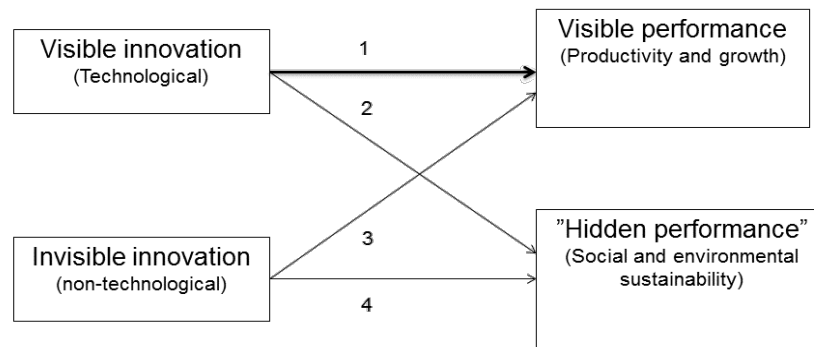


Figure 1. Innovation and performance gap in measurement of services (Source Djellal & Gallouj 2010).

The most apparent relation is between visible innovation and visible performance, but visible innovation may also lead to invisible performance by promoting the long term ecological sustainability or societal well-being. Correspondingly, invisible innovation may be a source of visible performance, i.e. growth and productivity, or promote sustainability.

The idea of "double gap" has been noticed to cause significant implications to public policies, which are still very technologist oriented and do not take into account the innovation and performance gap included. Thus, the invisible innovation and performance remain invisible in the policy making, causing problems – not only in the performance measurement as such – but also in target setting, and in steering and policy planning. In order to improve the situation, both the visible and invisible aspects in innovation and performance has to be included in an integrative way (Djellal & Gallouj 2010).

2.3 Opening the specific characteristics of service innovation and performance

After the realization of the narrowness of the assimilation view, two alternatives have gained ground. The first is the differentiation perspective – also known as the demarcation perspective (Coombs and Miles 2000; Gallouj 1994). It focuses on the specific characteristics of service innovation and has highlighted the difficulty of recognizing "newness" and its creator in the service context (Preissl 2000). The second alternative is an integrative or synthesis perspective (Coombs and Miles 2000; Gallouj 2002) which has become increasingly relevant due to the blurring lines between goods and services. It highlights the production and consumption that focus on integrated solutions and systems. The role of integrative services is emerging especially in the area of environment and energy (e.g. Hyytinen & Toivonen 2014).

Recently, these approaches have also been applied when searching better indicators for innovation and performance in services. The peculiar characteristics of services that specifically have been pointed out in this context are intangibility and the central role of interaction; the latter refers to the central role of co-production between the provider, customers and partners. An important implication of intangibility is the difficulty of defining the "unit of output" and differentiating the product from the process. These aspects challenge the definition of innovation and quality improvements in it. Interactivity increases the complexity of the development of services innovations (Gallouj et al. 2013). Ignoring these complex and dynamic relationships (cf. Arnold 2004) is often linked to the traditional technologic measures and the linear innovation model (Smith 2000; Edqvist 2005; Ahrweiler 2010). It may lead to the oversimplification of the reality and to the biased understanding – not only of the impacts of services and innovations – but also of their drivers and dynamics (Arnold 2004).

New aspects in the analysis are inclusion of the time factor and the social nature of services (Djellal & Gallouj 2013). Time highlights the dynamic nature of services, focusing to their evolution over time. Considering time as a dynamic factor leads to the differentiation of short-term outputs from medium and long-term effects. The social nature of services derives from the fact that the value and benefit of services is always defined by users. This means that different actors have different values, and it is just this multiplicity of values which makes it necessary to include various criteria in evaluation. In addition to immediate users, it is important to take into account the multiple values of indirect users as well as those of different actors participating in the development, (Djellal & Gallouj 2010, 2013). Thus, in service innovation boundary lines are blurring – not only between products and processes – but also

organizations often change simultaneously (PreIssl 2000). These kinds of combinatory innovations and their broader socio-economic impacts cannot be tackled on the basis of the traditional linear and industrialist models.

3 New framework for the evaluation of services

3.1 Multi-criteria approach to diversify the perspectives of evaluation

These above described challenges in measurement and evaluation of services intend to assess the performance and impacts on the basis of a multidimensional approach which takes into account the special characteristics of services as well as their aspects of quality and social value (Djellal & Gallouj 2010, 2012; Rubalcaba et al., 2012). Like writers have argued one potential and diversified way of analyzing the various impacts is by giving insight to different societal spheres “worlds of services” and their principles and values in the sens of Economics of Convention (Gadrey 2005; Djellal & Gallouj 2010, 2013).

In that model the outcomes are evaluated from the perspective of different goals encompassing both the traditional measures and the modern evaluation criteria taking into account the needs of knowledge society. In addition to the different target areas the model takes into account the long time-scale in the generation of impacts by dividing outcomes into the direct, short-term outputs and indirect, long term-outcomes (or impacts). The table 1 below illustrates the different worlds given the specific justification criteria related to the each of the worlds (Gallouj 2002; Djellal & Gallouj, 2013).

Compared to original model, we have made some minor modifications into it. Referring to the recent literature, the concepts concerning the aspects of social innovation, sustainability and responsibility should be taken more clearly into the consideration in the analysis of impacts (Rubalcaba et al. 2012; Djellal & Gallouj 2013). Our modifications concern especially the aspect of “the civic world” that originally was focused to social relations characterized by the ethical issues such as equal treatment and fairness. In this model we suggest to integrate the concept of societal value and responsibility into the idea of civic world and also rename it “responsible world”. By the addition our aim is to better take into the account the aspects concerning the social innovations, environmental sustainability and societal well-being.

In the original model also the word of innovation (referring to creativity and inspiration) is differentiated. Because in our study the focus is in analysing service innovations, the specific perspective of innovation world is excluded from our table. Instead we clarify the different elements of innovation by adding that perspective horizontally to the table and by analyzing these aspects in the light of each world.

Table 1. Different justification criteria to evaluate outputs and outcomes of services (modified from Djellal & Gallouj 2010, 2013).

Worlds	Industrial and technical world	Market and financial world	Relational and domestic word	Responsible word	Reputational world
Innovation	Central aspects of the innovation from the perspective of each world				
Output (direct, short term) <i>Performance related</i>	Volumes, flows and technical operations	Value and monetary and financial transactions	Interpersonal and organizational relations, trust, quality of relationship	Values like sustainable development, responsibility, equal treatment, fairness and justice	Brand, image
Outcome (indirect, long term) <i>Performance related</i>					

Analysing the impacts from the perspective of different worlds makes visible the multifaceted nature of service innovations. However, analytical table remains static and does not increase understanding of their dynamic and complex nature. It does not show how the different impact criteria are mutually interlinked and may reinforce or contradict each other. This perspective in our framework is considered with the system dynamic modelling tools more carefully described in the following sub-chapter.

3.2 System dynamic modelling to evaluate the dynamics of services

One key insight behind systems thinking is that interlinkages between different elements in a system can create complex behaviour. This complex behaviour and non-linear nature in the evaluation of impacts can remain unnoticed if each component, such as the elements in the table above, is analysed separately.

Systemic problems cannot be identified directly because systems involve several characteristics that make them counter-intuitive. The following features are important to take into account in particular (Sterman 2001):

- Systems are tightly coupled, i.e. the actors interact with another and with the outside world. Feedback is a central characteristic of systems: decisions of the actors trigger others to act, which again alters the next decisions of the original actors.
- The central position of feedback makes systems history-dependent: taking one path precludes many others.
- Systems are non-linear, i.e. effect is not proportional to cause. It is also difficult to identify immediate cause-effect relationships – instead of that cause and effect are often distant in space and time.
- Systems are constantly changing at many scales that interact. They are also self-organizing and adapting: small, random perturbations are often amplified by feedback, and capabilities of actors change as a result of learning.
- Systems are policy-resistant: the complexity makes it difficult to understand the system and as a result many seemingly obvious solutions to problems fail. Time delays in feedback often mean that long-run response of the system is different from the short-run.

System dynamics (e.g. Sterman 2001) is a methodology that focuses on the underlying feedback structure of a system. System dynamics models incorporate causal connections between system elements that can be mapped using causal loop diagrams. Simulation modelling is used to understand how the interaction of various feedback loops creates certain dynamic behaviour (i.e. change over time in variables of interest). Even though the role of simulation is emphasized in the system dynamics methodology, even qualitative diagrams that show the interactions and feedback loops in a system can increase understanding of a system.

4 Case context and methodology

In our empirical analysis the focus is in service innovations in the area of environment and sustainability. According to some recent studies (e.g. Djellal and Gallouj 2010, 2013) the technologist perspective dominates typically the discussion of sustainable innovations although the role of integrative services is emerging especially in that area.

In this paper the focus is in analyzing the complex combinatory innovations. By that we mean that they all encompasses both technological and non-technological ingredients and are developed in the collaboration between multiple actors. As regards their targets they are aiming to tackle with prominent societal challenges, among which the environmental sustainability is primary. Specific service innovation we are interested in is *Environmental data platform* that aims to be a comprehensive platform to support continuous data gathering and real-time environmental monitoring, analysis and reporting.

Innovation has been developed in research and development program built on public-private innovation network that aim to promote systemic change in the field of environmental measurement in Finland. The program is carried out by a Strategic Centre for Science, Technology and Innovation – a new Finnish innovation policy instrument. The centres (abbreviated ‘SHOK’) operate in various industrial and service sectors as limited companies and are built on public-private partnerships. SHOKs can be characterized as public and private innovation networks generating complex and architectural services and innovations (Djellal & Gallouj 2013b).

We have applied the case study methodology and qualitative approach in our study. The main method in data gathering in our study was face-to-face interviews (30 in total). The interviews were gathered between February and June 2013. We applied snowball sampling in the identification of interviewees: the first respondents were Managing Director of Cleen Ltd and the Program Managers. Based on their suggestions, we thereafter selected the other interviewees among the members of the program consortiums. The final sample represented actors in the area of sustainable energy in a versatile way. It consisted of representatives of private companies (e.g. energy companies, companies developing environmental and industrial measurement), and universities and other public research organizations. All interviewees were managers or experts in their organizations and had a significant role in the research programs. Typically they were acting as a work package leaders or leading the service demonstration development.

For the data gathering we applied a semi-structured interview method: the topics were decided beforehand but within them the respondents were given a great deal of freedom (Bryman and Bell, 2011). The main topics focused on the manifestations of new innovative solutions within the programs, factors that promote or slow down their generalization, impacts of the innovations and their evaluation. The duration of the interviews ranged from one and half to three hours. All interviews were recorded and transcribed. Documentary data on the general development of energy technologies and markets were used as supplementary material.

In the analysis and interpretation of empirical data we applied the modified multi-criteria and system dynamic perspectives. We started the analysis by studying how the environmental data platform is impacting in a short and long term from the perspective of different worlds of services. In the analysis we are reflecting impacts both from the traditional and modern perspectives. Thereafter we moved to system dynamics modelling that aims to increase understanding of the dynamics in the system that results from interactions between the parts of the system – including reinforcing and balancing feedback loops.

5 Research results

Environmental data platform (table 2) is from an industrial perspective a prototype platform to gather and share environmental data. As a short term output it integrates real-time data sources (e.g. measured data of water quality and

satellite data concerning environment and atmosphere) and provides visualized maps based on the data. In a long-term the goal is to integrate multiple data sources in it and provide “cloud-based comprehensive solution” to produce and share environmental data. Cloud-based solution would make the access to big data possible. In addition the architecture for real-time monitoring, analyzing and reporting will be created to improve the quality and reliability of environmental information, weather forecasts and warnings. New architecture helps in developing new end-user applications and thus accelerates business start-ups generation. Our respondents highlighted that services are in the central role in the development of comprehensive solution and new information architecture.

In the market world the main characteristic of the innovation is economically free access to the multiple data sources and especially to public sectors data. According to our interviewees free access to data is considered to be an important social goal and also a starting point for the development of data platform. In a long term goal is in opening new markets based on environmental analysis and in creation of new export possibilities.

Preferences and valuation principles in the relational world highlight the interaction between multiple actors and a role of end users is the development and use of service. Central innovative aspect here is the connectivity via one mediator to multiple data sources. As an output goal trust in the public-private innovation networks is enhanced. From the performance viewpoint enhances actors’ connectivity and consolidates the networks. Long-term goal is to integrate citizens to the data provision, to better take into account the specific users’ needs and requirements and hence provide personalized environmental data. That affects in a long term to users ability to be integrated part of the environmental data generation. Like our interviewees highlighted that development removes the clear distinction between the production and use of data: citizens are becoming data producers. That has been considered as a prerequisite for a systemic change in the sector.

From the perspective of responsible world overall sustainability is highlighted as a central value in development of new solution. The other value based aspects highlighted are transparency and the citizens’ equal rights to participate to the data provision. Innovative aspect relates to the open and equal access to public sector data. As a short term goal platform enhances transparency, availability and multifaceted use of public data. As a long-term goal respondents have considered the possibilities to apply new end-user applications for example to the game and school worlds to support the environmental education and thus increase the awareness of environmental issues from the early age. From the performance viewpoint that may increase responsibility as a value in decision making in individual, firm and policy level.

Table 2. A multi-criteria framework to analyse the impacts of environmental data platform.

	Industrial and technological	Market and financial	Relational	Responsible	Reputation
Innovation/Input	A prototype platform for environmental data gathering and sharing (integrating real-time data sources & data storage)	Free access to public sector data	Connectivity via one mediator to multiple data sources and end-users	Open and equal access to public sector data	Image as an innovation to enhance sustainability
Output (direct, short term)	Varied measured and satellite data concerning environment and atmosphere (e.g Weather radar visualised on the map)	Economical of free access to multiple environmental data sources	New connections and actor networks created (via new solution)	Transparency of public data; Easy access	Short term image
Performance related to output	Ability to process increasing amount of environmental data more quickly and more effectively	Reduced cost of sharing data Reduced cost of providing data	Increased connectivity between multiple actors	Increased transparency of public data Increased availability and better use of public data	Improvement/change in reputation and image
Outcome (indirect, longterm)	“Cloud-based comprehensive solution” for producing and sharing environmental data Architecture for real time environmental monitoring, analysing and reporting, bid data New end-user applications created New start-ups crated; new jobs	New market opening based on environmental monitoring New opening export possibilities	Integrating citizens and citizens’ requirements to the data provision “Users as a data providers” (<i>Social innovation</i>) Personalised environmental data Trust	Equality in sharing information (data) Quality controlled data Platforms applied e.g. in education: environmental education and awareness	Long-term reputation and image
Performance related to outcome	Improvements in weather forecasts, environmental information and warnings Increased quality and reliability of environmental data Increasing number of business start-ups based on environmental data; Increasing number of new jobs	Improvements in the generation of various types of revenues based on environmental data	Increased usability of environmental data /knowledge Increased trust	Increased awareness of environmental issues Increased responsibility in decision making (individual, firm and policy level)	Long-term improvement/change of reputation and image

Finally in the world of reputation innovation is analyzed from the perspective of brand and image effect. From a short and long term the aim is in analyzing how the innovation impact to the attractiveness of different actors. The aspects concerning the image and brand needs to be analyzed from the perspective of specific actors and are thus analyzed in details in the following sub-chapter.

To summarize the central findings from the perspective of different type of evaluation criteria following aspects have been recognized. According to our interviews services have important role in renewing the environment sector. To solve the most urgent societal problems, like sustainability, there is need to develop technologies and services as systemic wholes instead of individual technologies or services. The emergence of comprehensive service solutions in renewing the environment and energy technologies can be perceived by traditional measures. However the focus from the perspective of industrial and financial world is on technical characteristics of the concepts and solutions, not so much in their social and systemic nature.

To capture the interactive and social nature of service development as well as its' interlinks to the social goals and system level changes the other criteria are needed. Like our example show, relational and responsible worlds are particularly important to make these aspects visible. Like our respondents highlighted the changing roles of data users and producers ("from user to producer") plays a central role in the renewal and a system level change in a sector. That can be perceived only from the perspective of relational world. In addition our example shows that impacts generated in the different worlds are often interdependent and complementary to each other. Some factors in relational and responsible worlds can be seen as a prerequisite to effects generated from the viewpoint of technical and financial worlds. For example for the development of environmental data platform the transparency and open access to public sector data is seen as a precondition. However, the dynamic nature and interlinkages between different justification criteria are not comprehensible for readers because the analytical table remains. It does not show how the different impact criteria are mutually interlinked and may reinforce or contradict each other. This perspective in our framework is considered in the analysis carried out with the system dynamic modelling tools.

From the systems perspective (Figure 2) free access to data increases open and equal access to data, which creates new connections between actors. This in turn increases the ability to process multiple data sources quickly and efficiently and creates new market openings and new end user applications. An increased number of end user applications increases people's awareness of environmental issues, due to which new actors start producing data. These new actors then create more demand for transparency of data and political pressure to provide even more access to data. (Reinforcing feedback R1 "new connections between actors"). Increasing free access to data also leads to new market openings because of the reduced costs of sharing and providing data (reinforcing feedback R2 "reduced costs").

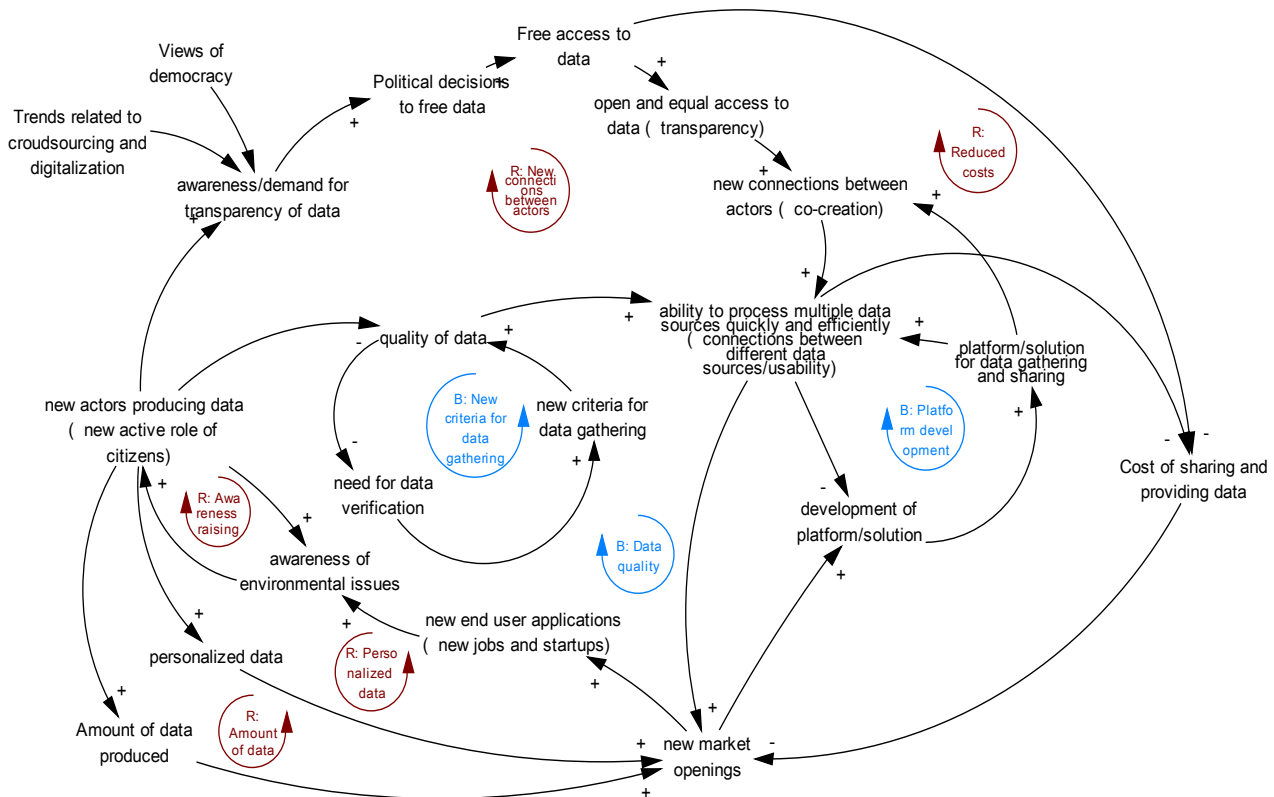


Figure 2. Systems perspective to environmental data platform.

As already noted, an increased awareness of environmental issues leads to citizens becoming active in producing data. This raises awareness even more (reinforcing feedback R3 "awareness raising"). An increased number of new actors

producing data also leads to more data and personalized data being produced, which can lead to new market openings (reinforcing feedbacks R4 and R5: “amount of data” and “personalized data”).

There are also balancing feedback loops in the system. Once the number of actors producing data grows, data quality may become an issue and can decrease the ability to process multiple data sources efficiently (balancing feedback B1 “data quality”). However, a low data quality that creates a need for data verification can lead to new criteria for data gathering, which then improves the quality of data (balancing feedback B2: “new criteria for data gathering”). The development of an environmental data platform can also be started in order to improve the ability to process multiple data sources (balancing feedback B3 “platform development”).

6 Concluding remarks

The purpose of this paper is to study the challenge of the evaluation in the context of the services. Because of their specific nature – especially immaterial and interactive dimension – the traditional evaluation methods and measures are not able to capture neither the diversity of the innovations nor the dynamic nature and multifaceted dimensions of performance in the sector. This paper aims to contribute to the need for a more diverse and dynamic evaluation approach. We focus on the context of service innovation in the area of environmental measurement in which we develop further multi-criteria and system dynamic perspectives. Multi-criteria framework describes the impacts of new sustainable services and system perspective analyses dynamic impacts of service innovation.

As a result we identified that services have an important role in renewing the services in environmental measurement. To solve the most urgent societal problems, like sustainability, there is need to develop technologies and services as systemic wholes instead of individual technologies or services. Furthermore the collaborative interaction between societal fields and multiple actors (including citizens) is extremely important.

The emergence of new technologies and new solutions in environmental measurement can be perceived with traditional measures. However the focus from the perspective of industrial and financial world is in technical characteristics of the concepts and solutions. From this traditional perspective neither the role of new solutions in renewing sector (social and value based aspects) nor the importance of interactivity in developing new solutions can be captured. To perceive and make visible the societal goals of the new solutions as well as their interactive nature relational and responsible worlds are particularly important. In addition relational world also focuses for example to the changing role of end users (“from user to producer”). That can be seen as an enabling factor for the systemic change in the sector and thus a central goal in renewing the sector.

Our analysis also shows that impacts generated in the different worlds are often interdependent and complementary to each other. Some factors in relational and responsible worlds can be seen as a prerequisite to effects generated from the viewpoint of technical and financial worlds. For example cornerstone and reinforcing feedback in developing new service innovations for environmental measurement relates to the free access of data (the perspective of market world). To attain it political decisions to open of public sector data sources (perspective of responsible world) are required. That development facilitates the equal access to the data for multiple types of actors and thus enhances the creation of new connections and provides the new type of collaboration between actors (relational world). This development supports the emergence of new market opening and the development of new end user applications. Like example shows, the relational and responsible aspects are needed to generate long-term technological and economic impacts.

The complex dynamics, interrelationships and multiple feedbacks between the different impact criteria remain invisible without systemic perspective. By integrating multi-criteria and system dynamic perspectives we aim to offer a dynamic alternative to create understanding of development and impacts of service solutions.

Regarding to the further studies more studies would be useful to test the generalizability of our results. Furthermore to go deeper to the dynamic relations studying the role (and impacts) of different actors in service ecosystem could be the next step. In addition generating indicators based on these findings would be both interesting and useful.

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Exploring the future use of forests in Finland: perspectives from sustainability oriented forest owners

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The objective of the study was to explore the views of sustainability oriented non-industrial private forest (NIPF) owners on the future use of forests in Finland. Findings from qualitative analysis based on 4 focus group discussions show that generally NIPF owners have a strong emotional attachment towards forests and are interested in more diversified opportunities of forest use in the future beyond dominant raw-material driven mindset. They also presented a lot of insight for enhancing intangible value creation based on forest ecosystem services. Even though groups of forest owners also recognized factors that inhibit the more diversified development of the forest-based services, they saw the overall future of forests in bringing welfare to society as positive. They identified unused possibilities in e.g. peer-to-peer learning via organized forest owner forums and cross-sectoral co-operation between forestry and nature-based tourism. Finally, results elaborated the high diversity between four groups in NIPF associations to forest use and their inherent service and information needs, which can be considered as a challenge for current service organizations. However, further research is needed beyond these findings to generalize them, as well as to study the business potential in sustainable lifestyle aspects of forestry.

1 Introduction

Finnish forest industrial sector is today facing multifaceted challenges such as low profitability caused by oversupply and volatility in traditional paper and wood product markets, changing institutions and many environmental issues are also perceived as controversial at societal level (e.g. Mattila et al. 2013). Traditionally, forest industry can be described as very raw material and production oriented sector that could be described by aspects of capital intensiveness, high cost competition and strategy towards production efficiency (Toppinen et al. 2013). However, in order to retain its legitimacy in the future, the competitive advantage for the whole sector needs to be sought also from the intangible values of forests and enhancing the role of services (e.g. Hetemäki et al. 2011).

Growing societal emphasis on sustainable development has raised the importance of bio-based economy, enhancing green consumers that emphasize sustainable choices in their everyday consumption patterns (see e.g. Roberts 1996, Young 2010). As a highly sustainable resource, forests offer huge potential for developing more sustainable products and services also in terms of intangible values, including food, health, leisure time and tourism possibilities (Hetemäki et al. 2006).

As a majority of forests are owned by hundreds of thousands of small-scale non-industrial private forest (NIPF) owners in Europe and United States, they have a control and an important effect on numerous tangible and intangible forest based ecosystem services. Comprehending the perceptions and preferences of NIPF owners have been the aim of several studies as they provide useful knowledge for the forest sector due to their high involvement role in natural resource utilization (e.g. Kuuluvainen et al. 1996, Kline et al. 2000, Butler et al. 2007, Häyrinen et al. 2014a). Organizations' closer collaboration with NIPF owners can also lead a better comprehension of customer value more generally, due to their dual role as consumers, especially in the countries where forest owners comprise a significant proportion of the whole population (Häyrinen et al. 2014b).

Our study approaches the value creation process from the sustainability perspective. We hypothesize that forest owners could be in an important role when considering new innovative ideas for forest utilization. The emphasis shift in forest owners' objectives towards intangible valuations must be explored greater depth. The aim of this study is to explore whether forest owner could recognize the future utilization prospects of forests. We specifically concentrate on owners who are considered to be representing sustainability oriented lifestyle.

2 Sustainability orientation of production and consumption in the bio-based economy

Global awakening to environmental protection and call for corporate responsibility, as well as rapid technological development, have changed industrial structure and affected significantly the use of forests in Finland (Hetemäki et al. 2006). The traditional forestry sector has been heavily dominated by the raw material dominant mindset and pursuit for production efficiency (see also Mattila et al. 2013, Nähkö & Pesonen 2014), but nowadays alternative value creation is emphasized increasingly for the future of forest use.

Increasing concern over sustainable development has directed the discussion towards individuals' sustainable lifestyles. A growing number of consumers have realized that their consumption behavior have an impact on

environmental problems and choose products that are more ecologically friendly (e.g. Laroche et al. 2001). Numbers of studies have e.g. attempted to understand and identify the underlying determinants of sustainable consumerism such as demographic and psychographic characteristics of consumers who represent sustainable orientation (see e.g. Straughan and Roberts 1999). Quite often, however, discussions on characteristics of environmentally conscious consumers have presented conflicting views and socio-economic background has not been found to accurately segment consumers' sustainability orientation any more (e.g. Diamantopoulos et al. 2003, Roos and Nyrund 2008), and more focus should be put on psychographic variables (Straughan and Roberts 1999). Consequently, also marketing managers are increasingly interested in the green segment of the consumers.

According to Korhonen (2012) in Finland a third of population belongs to segment of so called LOHAS-consumers (acronym for lifestyle of health and sustainability). These consumers represent lifestyle, in which ecological, ethical and social responsibility as well as healthy consumption options have an important role. According to Mohr (2011) LOHAS is a new social majority that will revolutionize the consumption markets in the upcoming years. There is also evidence on consumers following ecological lifestyle, also seek for information and like to experience new challenges (Chen 2014). According to Belz and Peattie (2012) LOHAS-consumers can come from any demographical background. Nevertheless, the concept of LOHAS is also criticized of being just a new phenomenon that allows consumption without a bad conscience (Bilharz and Schmitt 2011).

The global rise of green values is reflected also in the changing attitudes and values of non-industrial private forest (NIPF) owners in Finland. There are certain groups of owners whose forest ownership objectives have shifted towards intangible emphasis such as aesthetic, recreation and conservation values (Häyrynen et al. 2014b). While already one fourth of NIPF owners primarily emphasize recreation, nature, and landscape protection (Hänninen et al. 2011), there is also evidence on that a segment of forest owners don't find raw-material driven services in forestry service markets suitable to their specific needs (Häyrynen et al. 2014b, Mattila and Roos 2014). These owners are inherently passive in the timber market, but they can still be highly involved in owning forests. As NIPF owners in Finland comprise the most significant owner group, controlling 60% of the productive forestland (The Finnish Statistical...2013), their forests offer also significant societal benefits like recreation services in form of public right of access.

The benefits of customer involvement into new service development have been discussed in a number of studies (e.g. Alam and Perry 2002; Lundkvist and Yakhlef 2004). Service-Dominant Logic (SDL) mindset, which has been introduced within the field of marketing by Vargo and Lusch (Vargo and Lusch, 2004; 2006; 2008), highlights the mutual and reciprocal value co-creation between actors. Contribution of SDL for service innovation is that customers should be involved in several stages of service development process (Edvardsson et al. 2012). Hence, apart from being a necessity, the customers are seen as an opportunity for new service development (Matthing et al. 2004). Consequently, forest owners could act as co-creators in new business development regarding forest use.

The key issue arising from the findings of Berghäll et al. (2014) (the quantitative part of this study), suggests that environmentally oriented forest owners emphasize multifunctional aspects of forest ecosystem services more than owners who are less environmental concerned. Within this background, we assume that also environmental lifestyle of owners has an effect on how they utilize or value forest. Further, question is, could sustainability oriented forest owners be understood as lead users (see e.g. Von Hippel 1986)? Therefore, we hypothesize that sustainability orientation could lead to more in-depth views on the sustainable use of natural resource, contributing to future service and product provision. Hence, we aim at combining the sustainable oriented consumer logic to explore the future of ecosystem services provision. More precisely, we hypothesize that consumers who have higher sustainability orientation in their life, might also have deep insight on how to think outside the box in the context of creating novel value in traditional raw material dominated industry sector.

3 Research data and methods

The research was conducted as an explorative study. The data that was needed to accomplish the study's objective came from two sources: quantitative forest owner data and forest owner focus group interviews.

This study is a part of a broader research project "Fortune - A Radical Approach to Forest Sector Renewal". The project has several field phases ranging from qualitative to quantitative. While this study reports the results of a focus group qualitative phase, the feed and setting came from a quantitative phase. In the quantitative phase, the quantitative survey data was collected in August 2013 via telephone interviews (n=402) from a nation-wide registry of Finnish forest owners. The sampling and contact information were based on the customer database of The Finnish Forest Centre, which includes around 300 000 private forest owners in Finland. As Finnish forest owners' average age is relatively high (60 years according to Hänninen et al. 2011), we fixed the current age structure of forest owners in order to concentrate on owners that are younger than an average owner. Against this background, the aim was not to achieve an absolutely representative sample of landowners, but more to show also the future behavior of the owners. Hence, the sample was collected by selecting circa 20% of forest owners from five age class (under 30, 31-39, 40-49, 50-59 and over 60 years olds). Findings of the quantitative data analysis are not reported in this paper (see Berghäll et al. 2014) since we aimed at identifying forest owners who represent environmentally oriented lifestyle. The quantitative data was utilized to select a sub-sample of forest owners, who show high-involvement in environmental and social sustainability and forest ownership issues. However, as practice showed, it was not possible to reach only those owners presenting the ecological lifestyle. Hence, we also had to accept few other participants that didn't receive so high score in

sustainability orientation scale in the survey. The qualitative research data was collected in 4 focus group meetings in January and February 2014 consisting of total of 17 NIPF owners.

Characteristics of participants are presented in table 1 below. The length of focus group meetings ranged between 0:40 h and 1:29 h, with a mean of 01:09 h. Focus groups interviews were audio recorded and transcribed and were led by a moderator. The transcribed focus group citations were categorized on the basis of our study questions.

Table 1. Focus group information.

Group	Participants	Location and time of focus group interviews	Duration
1	3 females & 1 male, age: 29-57 years	Helsinki 22.1.2014, klo 10.00	73 min.
2	4 males, age: 26-67 years	Helsinki 22.1.2014, klo 17.00	40 min.
3	3 males, age: 42-68 years	Hyvinkää 30.1.2014, klo 17.00	89 min.
4	5 females & 1 male, age: 27-58 years	Tampere 24.2.2014, klo 17.00	72 min.

The objective of these focus group interviews was to give forest owners a topic, that they could discuss and form their own opinions freely and not to influence too much the course of the discussion.

The outcome of focus groups discussion could be categorized in three different themes: (1) importance of forests and forest ownership, (2) perceptions on the current state and future of forest sector and (3) group visions on emerging utilization potential for forest use and challenges related to these new possibilities.

The data was analyzed using inductive qualitative analysis and thematization. The relevant themes were identified by pattern matching.

4 Results

4.1 Perceived importance of forests and forest ownership

The discussions on importance of forests and ownership revealed that the most of the participants had a strong emotional attachment to their woodlots. Almost all owners had inherited their forests, which meant a strong emphasis on heritage value and economic security.

"I'm still always there whenever possible. I hike, pick mushrooms & berries, ski, I'll do whatever in forests whenever I need to chill out." (Group 1)

"The money is in safe, when it is invested into forests and apartments." (Group 3)

"It involves lots of emotional aspects...my grandfather planted a small birch grove back in the day about the same time that I was born so the birch grove grew with me at the same rate and at some point it was higher than me... That's the emotional bond..." (Group 4)

Forests wouldn't be sold to market, even though they were a cost. In many cases the value of forest as such was seen as more important than the economic income from selling wood.

"I will hold on to it (forest), even though I know that it will cause only costs over coming years... but it is nice to think that children and grandchildren could benefit from it even though purely in economic terms." (Group 1)

Forests as a stand were seen more valuable when compared to being cut down. For some forest owners the importance of forests and strong emotional bond formed through forest self work. Practical benefits from forests were also brought up in the discussions.

"Of course I become attached to it (forests), when I work there. Then again, when one needs to cut down the large timber forest, one will grieve..." (Group 2)

"Forests have been my best playground already as a child... I remember where I played and where the paths were and those paths aren't there anymore..." (Group 1)

Clear-cuttings were criticized in general. On the other hand, owners who hadn't owned forests very long time wanted to learn more and hear different and more diverse possibilities on how to manage their forests. In group 1 the wish was to network with other forest owners to discuss about forest and forest ownership issues e.g. in pursuance of forest fairs.

"...My objective is to understand something about these things that I could sell some timber and manage it properly, but I want to avoid situations, in which I have to regret something. So the idea is to understand these things better and familiarize myself with these issues." (Group 4)

"I really wish that someone would begin to think some options for clear-cuttings...I'm so disappointed to actions of Espoo (town). Isn't there any other use for the old trees than cut them down to make money, at least they could do it differently." (Group 1)

4.2 Perceptions on the current state and future of the forest sector

When the conversation turned to NIPF perceptions on the current and future state of the forest sector, the general consensus was that the traditional sector is too much controlled by large forest industry companies and the use of forest resources in Finland is orchestrated on the interests of the large companies.

"It is forest industry's raw material. That's what it is. It has been the largest industry in Finland and this is why the system exists." (Group 1)

"Forests are less diverse [today]. If we think about this issue related to the wildlife, forests should be more diverse, but it has lost because of the current forestry. There are economic values behind." (Group 3)

"These Finnish forests are plantations for forest industry... the nature conservation areas are the only real forests..." (Group 1)

On the other hand, in one group the benefits of loggings for recreational use were also brought up.

"I have nothing against commercially managed forests though, when you think about mushroom and berry picking...it is easier to find them from managed forests..." (Group 1)

Even though groups of forest owners also recognized factors that inhibit the development of the sector, they still saw the overall future of forest sector as positive. According to owners in general, the forest sector will be profitable also in the future due to long traditions, positive structural change, more diverse utilization of forests and emergence of new actors in the field.

"I believe that forest industry isn't the thing that interests inventors and innovators at the moment...everybody is just developing these games. But I'm completely sure that in some point it will interest and someone will invent something totally different out of wood, and the industry will remain. But it isn't these old stuff, it will need to be something novel." (Group 1)

"I think that the forest sector remains stable in Finland." (Group 2)

"It is not a great concern, because wood is always needed lots anyway... These other bio projects, especially the one that they make biodiesel from pine fiber...it is a quite interesting project." (Group 2)

"It will consist of several small pieces...there won't be only one large industry, but the industry is formed from all the little things in the future." (Group 1)

Female forest owners underlined strongly the masculine image of the sector and they thought that increasing share of female owners was a positive aspect for the entire sector through novel utilization prospects and more ecological orientation. Especially in female dominant groups many participants saw e.g. forest owner associations as too traditional actors that only facilitate the industrial timber procurement. In addition, new forest owners with their novel perspectives and interests were seen as potential for renewal of the traditional sector.

"It is distressing that there is a huge masculine system behind. Now, when there are a lot of female owners who have inherited forests, then one might even make a difference." (Group 4)

"People are more heterogenous. Forest owners are completely different today, and they have a variety of interests compared to old days when all of them were from the countryside... there is a totally different starting point." (Group 4)

4.3 Visions on prospects of using forests

Across all four focus groups participants were generally well aware of expanding potential of the use of forests in the future and they presented a lot of insight for intangible value creation. According to forest owners (especially in group 4) more emphasis was put on developing forest based recreational services. Health and sport related activities also intrigued owners in group 4. Owners discussed e.g. about creating health yoga services and path running events as enhancing health and wellbeing. One of the owners had experience on organizing eco-psychology courses and also others in the focus group got excited about forests' role in nursing.

"I've been in a path running school...there is more interest in it... There is a huge potential in Finland to organize this sort of events that can be very interesting for foreigners as well." (Group 4)

"I'm a member of an association which will organize a course on "basics of ecopsychology" in March... It will deal with the nature-based methods and their utilization e.g. in nursing and education. In practice it means that a patient group will be taken out to nature and also plants are taken inside." (Group 4)

"One of these is yoga, which has been a huge hit and people appreciate much all these "mindfulness" things. Forest as an environment is naturally giving you a peace of mind." (Group 4)

Many participants emphasized the role of Finnish special nature to attract tourists. Some ideas were also based on owners' own experience such as offroad safaris as a form of adventure tourism, but the organization was seen as problematic.

"We have a huge reserve in nature and forests...In my opinion it is worth of investing in intangibles...If you are able to sell the atmosphere and experience...of course you need an extra trick there..." (Group 3)

"As I have to travel due to my work, I will have to say that we spectacular sceneries and there is a broad potential to travel in forests, and also promote it. This is special. When I come from China back to Finland I can breathe freely again..." (Group 1)

"Those will require a huge amount of capital into the equipment. And are you allowed to establish an off-road track on your forest estate without a permission...I'm a bit suspicious of those safari recreation actions and other stuff because of all those different laws... all the environmental permissions are required and what if something like oil damage occurs, what about then..." (Group 3)

Importance of environmental aspects was discussed in general. Participants felt that Finns in principle are willing to support the more ecological or socially responsible consumer products, but they are not willing to pay for those. This has led to the situation, in which there isn't sufficient demand, although for example demand for organic food is on the rise.

"At one time there was a much talk of organic products...which would be great, but then there wasn't demand for them...It is just like that it costs more because it is produced in a different way, but consumers don't want to pay for it." (Group 3)

Converting forests to conservation areas was brought up as one of the potential uses due to carbon market. It was also considered that forests have a special value as they are and hence, forests could be left in natural state. Again, as the discussion continued, it was noted that natural values alone won't be sufficient for forest owners. On the other hand, the participants acknowledged that the majority of the owners are not likely to be willing to convert forests into conservation areas without a financial incentive, because of the importance of financial security and income.

"Usually nature alone is not enough... one needs an economic viewpoint as well" (Group 1)

"Then there are these carbon dioxide directives and others... as forests are renewable raw material... It has potential..." (Group 3)

However, it was brought up that due to their abundance forests are taken for granted in Finland, and the wide range of benefits provided by nature are not appreciated enough, let alone commercialized due to extensive everyman's rights.

"For Finns these things are so self-evident, that one cannot think these things commercially." (Group 4)

"Foreigners are able to understand the value of forests in a spiritual and mental sense. I've read that the Japanese have made a health forest certificate. Forest has health value... spending time in forests lowers blood pressure and level of stress hormone and enhances resistance etc. We as Finns should understand how incredible value we have, from which something like this could be created... then there are also recreation walking parks, but those are difficult for tourists to get to, those should be easily achievable." (Group 4)

Potential of value added wood products were brought up in few focus groups. Their commercial potential of value adding was seen as good, because it was seen that consumers are willing to pay for high-quality native wood products, which would also be competitive advantages. Value added products would lead to higher revenues and competitive advantage through own expertise.

"There has been a lot of talk about increasing the degree of upgrading, it isn't just the bulk that should be produced but the added value has to be found from further processed products. Consumers are willing to pay more for wood products, especially domestic ones." (Group 4)

"It is always the costs that are counted. It should be made as very trendy... e.g. these wood constructions and wooden buildings... so even though the prices would be higher, it would pay off and find a market..." (Group 3)

“One thing that could interest in the world if it was more marketed could be our domestic log houses. It is a good because one can shake it a lot before it collapses... for earthquake zones...” (Group 3)

Yet, further development of NIPF-based business ideas and innovations was seen to be very challenging. The capital intensiveness of industry was considered as the most challenging barrier for individual owners. Forest owner should have a plenty of cash and good contacts in order to develop ideas any further. Also, development needs were found in marketing skills.

“We are poor marketers though. We would have so many things here, we just don’t see the potential and sell it. We take all the things for granted. If we looked at the American way, these things would be completely different in this country. We have lived so modestly... Enthusiasm for marketing is lacking in general.” (Group 3)

“Just like this, we need to find a niche. No matter how good the idea, we have limited demand, and when we think about e.g. some narrow sector or hobby, the demand is very limited. It’s a question how good you are at marketing and where is it located.” (Group 3)

When conversation turned to sustainable lifestyle and how this could be present in forest owners lives and their forest ownership, the topic turned out to be difficult. Participants in group 4 felt that alienation from the nature doesn’t only affect adults but also their children. One proposed solution was bringing forests into urban areas one way or another. However, some participants suggested that a general alienation from nature could create novel forests creation related commercial opportunities.

“It seems that many people in Finland have estranged from nature and forest, especially in larger cities. There would be a several kind of recreational opportunities to offer... As long as the potential would be applied.” (Group 3)

“Forests offer many sort of things, but everything has costs in the beginning, so one should start with selling of the intangible experiences. One wouldn’t be so tied to the entrepreneurship. And even though the return was lower, it would be easier on a smaller scale.” (Group 3)

5 Discussion and concluding remarks

The aim of this study was to explore how the future opportunities in forests-based services is perceived in the context of sustainability oriented Finnish forest owners. Although the qualitative research approach was able to provide very general views on the themes, some useful insights were recognized. More general, participants of the study can be considered as modern and future-oriented forest owners with diverse values, interest in many possibilities besides timber production and were eager to learn more. Due to diverse characteristics of participants, also the discussion themes were perceived differently. The summary of the findings are presented in table 2.

Table 2. Summary of main findings in focus groups.

Group 1	<ul style="list-style-type: none"> • Strong emotional attachment to own woodlots, forests wouldn’t be sold to market even though they were a cost • Forest sector needs to be renewed, sector is under many changes; general resistance to clear cuttings • Potential in recreational and tourism activities: especially the role of Finnish nature; emphasis should be on other possibilities rather than timber trade, though economic aspects have to be taken into account • Information needed on existing and alternative forest management practices or use, not just traditional; the wish was to network with other forest owners
Group 2	<ul style="list-style-type: none"> • Forests as economic security; importance of forests and strong emotional bond has formed through forest self work • Overall future of forest sector was seen as positive, new possibilities to use wood will be found in the future • Potential in travelling, construction, composites, technological solutions in forest planning; challenges in commercialization

Group 3	<ul style="list-style-type: none"> • Heritage and economic security values the most important ones, emotional attachment to own forest has formed through forest self work • Current state of forest sector is challenging, e.g. high productions costs; future of forest sector was seen as somewhat positive if forest will be used more diverse and rational • Interest in diversification of forest business through value adding and marketing: e.g. wood constructions; a lot of potential in forest recreational experiences: e.g. the role of Finnish special nature to attract tourists and adventure travelling; confidence in the Finnish know-how in forest sector
Group 4	<ul style="list-style-type: none"> • Authority to decide how to manage own forests is important; firewood, berries and mushrooms as important benefits, forests as economic security and heritage are important • The masculine image of the sector was emphasized but increasing share of female owners was seen as a positive sign; resistance to clear cuttings • More emphasis should be put on developing forest based recreational services: e.g. health and sport related activities, potential also in nature tourism and value added wood products; the wide range of benefits provided by nature are not appreciated enough, let alone to commercialized due to extensive everyman's rights • Information needed on forest owning as general as well as existing and alternative forest management practices

Based on the findings from the perspectives shared by the focus group participants, some generalizations can be made. The discussions on perceived importance of forest ownership brought up a strong emotional attachment towards one's forest. Some owners were even willing to compensate lower timber sales income with more ecological use of forests (e.g. no clear-cuttings). Total value of forest was seen higher than the economic benefits. Findings of this study showed that although forest owners might be inactive in timber markets, they can be at the same time be very dedicated to their forests and ecosystem services these provide (see also Häyrynen et al. 2014b).

The current state of the whole industrial sector was seen as somewhat in a flux. Focus groups interviews indicated that there are a broad range of opportunities, but their commercialization requires a new way of thinking for the whole forest sector. In some groups NIPF owners were annoyed that forest owner associations serve the needs for timber industry and also other service organizations provide mainly services that are focused on intensive wood production. Especially many of the female forest owners in focus groups desired a broader variety of options for forest management. This finding is in line with Häyrynen et al. (2014b), who found that timber trade oriented mindset of the service organizations doesn't attract all the owner groups (see also Hujala et al. 2013, Kuipers et al. 2013).

Generally NIPF owners in focus groups voiced for more diversified use of forests and they presented a lot of insight for intangible value creation. Yet, totally new ideas during the discussions didn't bring up. However, groups clearly wanted changes for the practices and services available in the sector. According to the findings of this study, more emphasis should be put on recreational service development. E.g. nature-based tourism prospects in Finland are seen as favorable due to socio-economic changes in population and increased awareness on health and environmental issues (Sievänen 2005). However, in generation of nature-based tourism and cultural forest ecosystem services the main challenges are related to development of new service business models, and more precisely to how appealing factors of nature are formed as service packages for different customer segments (Peltola 2007). However, free public access to forests in Finland challenges the implementation of commercial innovations in recreational services, as citizens are unaccustomed to pay for them (Weiss et al. 2007). In addition, as foresters have a main aim at timber production, they can have a reserved attitude towards recreational services and products. Also from the forest owners' viewpoint, economic benefits are not common, because it isn't very common to compensate use of forest for e.g. nature-tourism purposes (Matilainen and Lähdesmäki 2014). Enhancing the cross-sectoral co-operation between forestry and tourism are required for service innovations to occur (Weiss et al. 2007).

Many NIPFs (in group 4 especially) voiced for more opportunities to peer-to-peer discussions about potential of forest use and experiences. In this respect recently renewed Forest Act in Finland is aiming at more customer oriented thinking as it provides more freedom of choice for owners to implement their own management objectives. The Forest Act e.g. allows continuous-cover silviculture in all forests, which has earlier been more limited and also promotes more diverse forest management practises.

However, the focus groups interviews also emphasized, that creating profitable business around the intangible values will obviously be challenging. Therefore, highly committed forest owners (although not focused on timber production) could therefore more actively be involved in the discussion on potential of broader forest ecosystem service provision in the future. Customer integration for the service development is becoming increasingly important (Edvardsson et al. 2012). Introducing SDL perspectives could bring fresh ideas to a very traditional way of thinking lacking in depth sustainability orientation. In the forest sector, including forest owners into value creation process, could lead to emerging of new ideas and opportunities.

All in all, there is a need for more diverse and in-depth co-operation between political decision makers, forest owners, forest industry and research and extension organizations. In case of Finland, it is evident, that forests can't be utilized for the needs of the society without non-industrial private forest owners. As this study has also showed, a lot of diverse aspects were considered in different groups, underlining that modern forest owners can be also very future oriented with multiple thoughts and objectives.

Despite the limitation of a small data and relatively short interaction in the group, a rich data was created based on the focus groups interviews, so the choice of this method in this context can be considered as successful. During the discussion, opinions of others encouraged also other forest owners' comment and talk more. This led to multidimensional discussion and versatile themes. Yet, working within the confines of the available data, the study however contains limitations that can be pointed out. As being an explorative exercise to study ecologically oriented forest owners, one of the limitations of the study is the use of a convenience sample and hence, the results cannot be generalized to the broader population. In addition, while our measures in the quantitative part of this study was originally designed for gauging sustainable or green lifestyle, this was later seen to be a challenging task. Due to the difficulty of reach the forest owners and also the last minute cancellations, every owner in our focus group sample can't be classified as representative of a sustainable lifestyle. Further, by accident the structure of focus groups formed very homogenous in terms gender. Groups 1 and 4 consisted mainly of female owners, and conversations were related more on meaning of forests and new ecological utilization prospects, while groups 2 and 3 consisted of only male owners, that showed in a way that men were observing and analysing the forest sector from the practical perspective and from the basis of their own experience. Findings from the previous studies have also indicated that female owners appear to emphasize more ecological and preservation forest values than males (Nordlund and Westin 2011; Häyrynen et al. 2014b) and e.g. forest management activities are less common on properties owned (or in charge of) by females (Lidestav and Lejon 2013).

In face of a strong societal emphasis on sustainable development, the development of environmentally aware consumers is becoming increasingly important also among forest owners. Findings of the study conclude that forest owners presenting environmental conscious lifestyle could be seen as forerunners in the forest sector when considering the renewal and implementation of forest utilization and related services in Finland. Results of the study however, have to be considered as tentative and further research is needed to generalize beyond these findings to study business potential of sustainable lifestyle aspects in forestry. Because being an exploratory study from its nature, our study raises even more questions. In the future, it could be fruitful to investigate the means of creating networks of dialogues between the various actors in the field.

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Assessing the impact of innovation on national competitiveness in the European Union

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Innovation, invention, research and development and provision of services represent pillars of a high productivity that supports competitiveness. The link between competitiveness and innovation represents the central point of the paper. The potential intensity of the connection is tested through an econometric analysis, where the national competitiveness in European Union is represented through Global Competitiveness Index or Country Competitiveness Index. As for the determinants of innovation, the eight dimensions of the Innovation Union Scoreboard will be used. The impact of the innovation's determinants on the national competitiveness of the 28 Member States of the European Union is the main aim of the current research paper. "Human resources", "intellectual assets" and "finance and support" determinants are validated as having a positive impact on national competitiveness in EU. Finally, several recommendations for the development of the innovation's determinants are presented.

1 Overview of the connection between competitiveness and innovation

1.1 Concepts and relationship

Even though there are various and even contradictory opinions on the definition of national competitiveness, the interest of public and politicians for the country's competitiveness has increased during the years. As Jovan and Bradić-Martinović (2014) sustain, policy makers focus on "achieving, maintaining and increasing the level of competitiveness, both at micro and macro level" for the development of corresponding policies at the national and regional level. The policy makers have a highly interest for the relationship between innovation and competitiveness and the proof consists in the strategies that are proposed to achieve the maximum economic impact of innovation.

In terms of concepts, Fagerberg and Nelson (2003) define competitiveness as "the creation of the locally differentiated capabilities needed to sustain growth in an internationally competitive selection environment". Particularly, competitiveness at the country level refers to "the way in which the pattern of international trade evolves over time to reflect changing patterns of capabilities and hence competitive advantage" (Fagerberg; Nelson, 2003).

"Human capital, technological progress, macroeconomic stability, institutions, and innovation" represent the main factors that influence the economic growth, which is frequently associated with competitiveness (Charles; Zegarra, 2014, 5371). Becker (2009) highlights that the relationships between R&D spending and innovation, as well as between innovation and economic growth, productivity, competitiveness and institutional structure is still unclear defined. However, based on the review of the scientific literature, Vieira et al. (2008) is pointing out that productivity and innovation are positively connected. Moreover, Oslo Manual (OECD; Eurostat, 2005) is specifying that innovation constitutes the central element for growth of output and productivity. Similar idea is sustained by Balalia (Iosif) et al. (2012) that remark the powerful interdependence between innovation and competitiveness.

Innovation is considered one of the main factors with influence on the current and future competitiveness of highly advanced economies. Additionally, location, specialization, and infrastructure may prove as important as innovation (Becker, 2009, 133). Similarly, innovation is perceived as one of the main drivers of competitiveness of emergent markets, next to internalization and institutions (Kumar; Mudambi; Gray, 2013).

The goal of this research paper is to provide support to policy makers, business, and academic community in their endeavour to improve national competitiveness in the European Union by means of stimulating innovation.

Starting from the positive connection between competitiveness and innovation, the main objective of the paper is to identify and assess the impact of the innovation's determinants that influence the national competitiveness of the 28 Member States of the European Union.

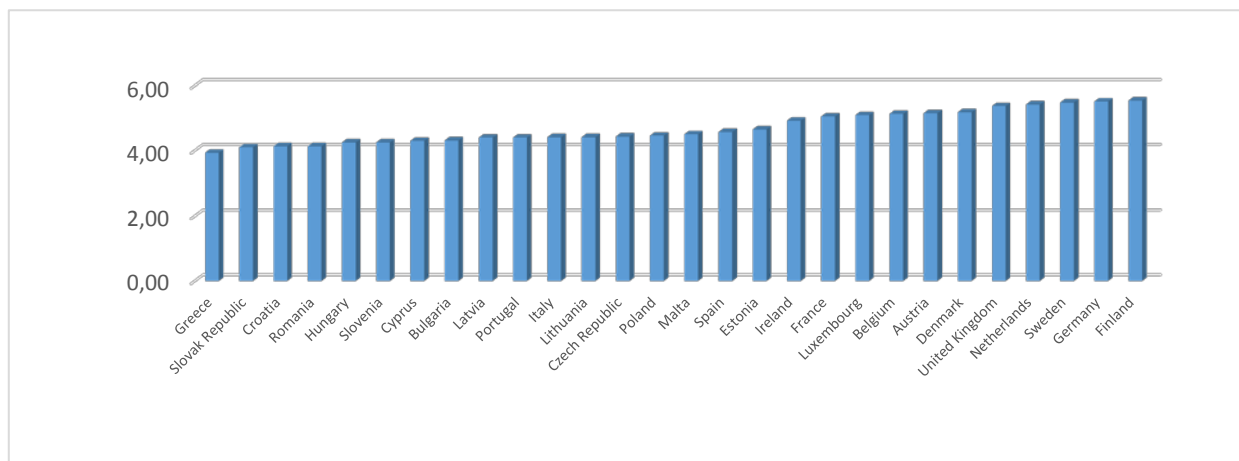
1.2 Measurement of the national competitiveness and innovation in the European Union

Competitiveness is measured in various ways, growth in productivity per hour and unit labour costs are some of the most relevant indicators. As Becker (2009, 134) stated, these particular indicators are imprecise due to their dependency on economic output and, possibly, rising or falling prices. Three of the most important instruments that capture the complexity of competitiveness are elaborated by World Economic Forum – WEF that is publishing the Global Competitiveness Report, the International Institute for Management Development – IMD that is elaborating the World Competitiveness Yearbook, and the Joint Research Centre within the European Commission - JRC that is developing reports on EU Regional Competitiveness Index. For this paper two indicators are used to capture the magnitude of the

national competitiveness in EU, namely the Global Competitiveness Index, elaborated by the WEF, and Country Competitiveness Index, developed by JRC. Each competitiveness indicator will be the explained variable in relation to the determinants of innovation included within the Innovation Union Scoreboard.

The Global Competitiveness Index (GCI) includes 12 main pillars divided by three main categories, as follows: institutions, infrastructure, macroeconomic environment, health and primary education are components of the “basic requirements subindex”; higher education and training, goods market efficiency, labour market efficiency, financial market development, technological readiness, and market size refer to “efficiency enhancers subindex”; and pillars like business sophistication and innovation belong to “innovation and sophistication factors subindex” (Schwab; 2013, 9). Some of the minuses of GCI that were identified by Lall (2001) refer to the undertaken assumptions, the type of variables used, the causal relations and the use of data within the competitiveness index. During the years, the competitiveness index was continuously improved by surpassing the shortcomings identifiable at the beginnings.

Based on the scores of GCI 2013–2014, the ranking of the 28 Member States is illustrated in graph 1.

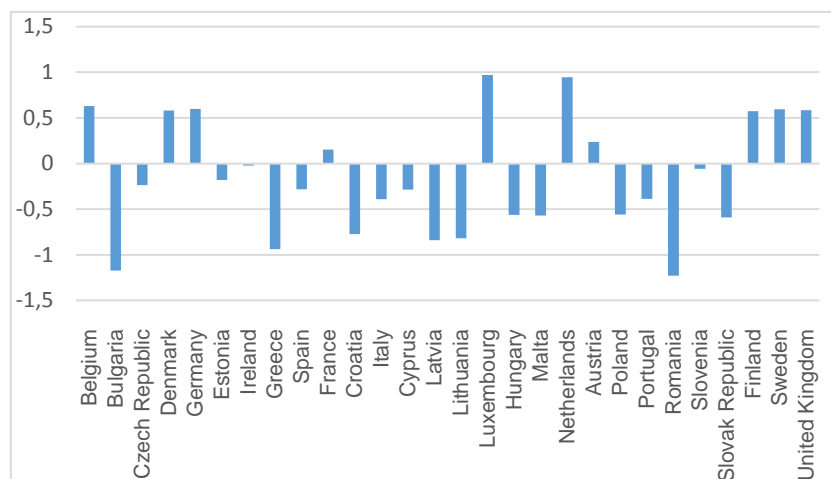


Graph 1. The Global Competitiveness Index 2013–2014.

Source: own representation, based on Schwab, K. (Ed.) (2013): The Global Competitiveness Report 2013–2014. Switzerland: SRO-Kundig, p. 15–16.

Graph 1 shows that Nordic countries, such as Finland, Sweden, Denmark register a high level of competitiveness, while Greece and Slovak Republic are positioned on the last places of the ranking. According to the scores of competitiveness, Poland and Malta are among the countries situated at the middle of the ranking.

The distribution of the Country Competitiveness scores for the 28 member States of the EU for 2013 is shown in graph 2.



Graph 2. The Country Competitiveness Index 2013.

Source: own representation, based on Annoni, P and Dijkstra (2013): EU Regional Competitiveness Index. Luxembourg: Publications Office of the European Union, p. 135.

Graph 2 indicates that Netherlands and Luxembourg are the top countries in terms of national competitiveness, while Romania and Bulgaria are situated on the last positions of the ranking.

There are similarities between the two indexes and the correlation is expected to be tight, as it was the case of CCI 2013 with GCI 2012-2013 (Annoni; Dijkstra, 2013).

As regards the measurement of innovation at the European Union's level, the Innovation Union Scoreboard (IUS) represents the main instrument used to monitor the implementation of Europe 2020 Innovation Union initiative. This instrument includes 25 indicators and offers an overview on the innovation performance among the 28 Member States of EU.

IUS is divided into three main categories represented by enablers, firm activities and outputs. Under these categories there are several dimensions, namely human resources, research systems, finance and support associated to "enablers", firm investments, linkages & entrepreneurship, intellectual assets corresponding to "firm activities", and innovators and economic effects considered as "outputs". Each dimension has its corresponding indicators. Particularly, under "human resources" the following variables are encountered: new doctorate graduates, population completed tertiary education and youth with upper secondary level education. Subordinated to the "open, excellent and attractive research systems" there is international scientific co-publications, scientific publications among top 10% most cited, and non-EU doctorate students. "Finance and support" are represented through the variables R&D expenditure in the public sector and the venture capital investments.

"Firm investments" is represented by R&D expenditure in the business sector and non-R&D innovation expenditure. SMEs innovating in-house, innovative SMEs collaborating with others, public- private co-publications are variables situated under "linkages & entrepreneurship" dimension. "Intellectual assets" includes the following variables: PCT patent applications, PCT patent applications in societal challenges, community trademarks and community designs.

"Innovators" dimension refers to the following variables: SMEs introducing product or process innovations, SMEs introducing marketing/organizational innovations, and fast-growing innovative firms. Employment in knowledge-intensive activities, contribution MHT product exports to trade balance, knowledge-intensive services exports, sales of new to market and new to firm innovations, license and patent revenues from abroad are positioned under "economic effects" dimension (Hollanders; Es-Sadki, 2014).

Each presented indicator has a score that by their unweighted average leads to the yearly composite Summary Innovation Index. Each Member State has its corresponding Innovation Index, scores for its eight dimension and scores for each indicator. The eight dimensions of the Innovation Index are the independent variables which will be tested in relation to the national competitiveness in EU.

According to the Innovation Union Scoreboard 2014, the differences of innovation performance generates four performance groups, as follows:

- Innovation leaders, where Sweden, Denmark, Germany, and Finland are included;
- Innovation followers, represented by countries such as Austria, Belgium, Cyprus and others;
- Moderate innovators, such as Croatia, Czech Republic, Greece and others;
- Modest innovators, represented by Bulgaria, Latvia and Romania.

This section has outlined the link between innovation and competitiveness, and their corresponding indicators, while the following part of the paper is presenting the methodology and the results obtained through the econometric analysis.

2 Econometric analysis

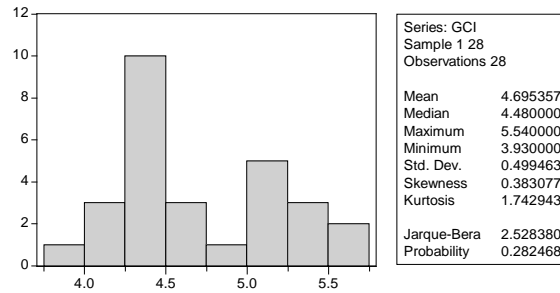
2.1 Methodology

The methodology corresponds to the main objective of the paper that is focused on identifying and assessing the impact of innovation, through its determinants, on the national competitiveness of the 28 Member States of the European Union. As presented in the previous section, the two main indicators that are associated to the national competitiveness are represented by GCI and CCI, while innovation is associated to IUS. The paper is elaborated based on the most recent data bases, identifiable in the Global Competitiveness Report 2013-2014, respectively Innovation Union Scoreboard 2014 that sums up the results for the 2013.

Econometric and statistical analyses, economic models, and micro or macro case studies are the main three types of studies dedicated for testing the relationship between competitiveness and innovation (Clark; Guy, 1997,12) Out of these three directions, the econometric analysis is used as the main method within this paper. The explained variable is considered to be the GCI or CCI, while the explanatory variables are considered the eight dimensions of the IUS. The main tools used for this research are represented by the documentary analysis and the data bases available at both the international and the European level.

2.2 Data analysis

The characteristics of the series of data corresponding to the dependent variable GCI are exposed in graph 3. Poland and Malta are associated to the median score of 4.48. Finland registers the maximum value with a score of 5.54, and on the opposite side the minimum value is allocated to Greece with an index of 3.93.

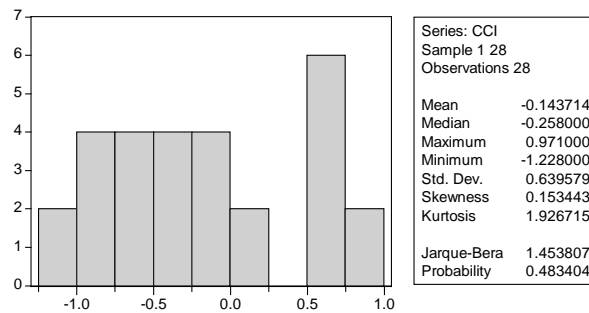


Graph 3. Descriptive statistics of the dependent variable GCI.

Source: Eviews results, based on the data extracted from Schwab, K. (Ed.) (2013): The Global Competitiveness Report 2013–2014. Switzerland: SRO-Kundig., p. 16.

Skewness indicates a distribution oriented towards left, registering more extreme values to the right side. With a value of 1.74 for kurtosis, the distribution is platykurtic, namely the data values are spread on a wider area around the mean, compared to a normal distribution.

The descriptive statistics of CCI is exposed in graph 4 and reveals that the median value corresponds to Austria. Luxembourg registers the maximum value, while Romania is the country with the lowest level of CCI.



Graph 4. Descriptive statistics of the dependent variable CCI.

In Table 1 are presented several issues of descriptive statistics corresponding to the eight dimensions of innovation, as independent variables.

Table 1. Descriptive statistics of the eight dimensions, part of the Innovation Union Scoreboard.

Variable	HR	RS	FS	FI	LENTREP	IASSETS	INNOV	EEF
Mean	0.588393	0.428536	0.460500	0.372964	0.504821	0.443643	0.469393	0.490607
Median	0.596500	0.394500	0.438000	0.357000	0.507500	0.461500	0.492500	0.501000
Maximum	0.869000	0.822000	0.794000	0.655000	0.840000	0.840000	0.914000	0.775000
Minimum	0.261000	0.089000	0.057000	0.105000	0.117000	0.100000	0.047000	0.193000
Std. Dev.	0.139646	0.250603	0.200308	0.160668	0.244950	0.226435	0.225820	0.152148
Skewness	-0.100974	0.218703	-0.073733	0.183334	-0.188330	0.212013	0.014742	-0.256194
Kurtosis	2.898763	1.641181	2.072947	2.033061	1.704229	1.971736	2.239875	2.446303
Jarque-Bera	0.059537	2.377333	1.028036	1.247653	2.124377	1.443312	0.675103	0.663977
Probability	0.970670	0.304627	0.598088	0.535890	0.345698	0.485947	0.713515	0.717496

Source: Eviews results, based on the data extracted from Hollanders, H.; Es-Sadki, N. (2014): Innovation Union Scoreboard. Belgium, pp. 82–83.

Sweden is the member state of the EU that has the highest value in terms of “human resources” performance score, while Denmark is the leader at the “research systems” dimension. The minimum for the first dimension is allocated to Malta, while Latvia has the lowest score for the second dimension. Related to “finance and support”, Estonia is the leader, while Bulgaria registers the poorest score. As for the “firm investments” dimension, Sweden occupies the first place, while the last is occupied by Latvia. “Linkages and entrepreneurship” dimension is led by United Kingdom, while Romania is situated at the opposite side. In terms of “intellectual assets” and “innovators” Denmark is on the first position, while Romania, respectively Bulgaria are the last. In terms of “economic effects”, Ireland is placed on the first

place, while Lithuania is situated at the bottom of the ranking. The probability corresponding to Jarque-Bera statistics is higher than 0.05, meaning that the series of data follow a normal distribution.

2.3 Results

The correlation between the competitiveness at the national level in the EU and the determinants of innovation, represented by the eight dimensions of the IUS, takes the form of a multiple linear regression, as presented in equation 1. “COMP” is the general name for national competitiveness, whether is represented by GCI or CCI.

$$COMP = C(1) + C(2)*HR + C(3)*RS + C(4)*FS + C(5)*FI + C(6)*LENTREP + C(7)*IASSETS + C(8)*INNOV + C(9)*EEF \quad (1)$$

Further on, two cases will be presented as the national competitiveness in the European Union is represented through two indicators, namely GCI and CCI.

Case 1. The dependent variable is represented by the GCI and after applying the least square function the equation 2 is obtained.

$$\begin{aligned} GCI = & 3.353442729 + 0.9937627192*HR + 0.8428399859*RS + \\ & (0.000) \quad (0.057) \quad (0.104) \\ & 0.3054795663*FS - 0.00074774081*FI - 0.8036491689*LENTREP + \\ & (0.469) \quad (0.999) \quad (0.130) \\ & 1.404967646*IASSETS - 0.07263914875*INNOV + 0.1469644145*EEF \quad (2) \\ & (0.005) \quad (0.860) \quad (0.791) \end{aligned}$$

In order to test the stability of the model, the Ramsey test is applied, based on the following hypothesis:

Null hypothesis (H_0) is that the correct specification is linear, while

the alternative hypothesis (H_1) is that the correct specification is non-linear.

F statistic < F critical, as $0.056 < F(0.05; 7, 20) = 2.514$, meaning that the null hypothesis is accepted, and the model is correctly specified as linear.

After testing the stability of the model, by using the Ramsey test, and the linear relationship between the explained variable and the explanatory variables was confirmed, other tests are going to be applied on the regression. The purpose of the tests is to determine whether the regression is good or has some minuses.

Firstly, a good regression must be strongly fitted to data, meaning a high value of R^2 . In this particular case, R^2 registered a value of 0.89, so it can be said that the regression is very good. This means that 89% of the dependent variable could be explained by the influence of the explanatory variables included within the model.

Due to the fact that the most p-values associated to the independent variables are above 0.05 level, the correlation between variables was tested. The correlation matrix indicated several strong relationships between variables, for example a connection of 0.84 is established between „research systems“ and „linkages and entrepreneurship“. Consequently, after various attempts of checking the potential connections between the independent variables representing innovation and the “global competitiveness index”, only two variables remained within the equation, as presented in equation 3.

$$COMP = C(1) + C(2)*HR + C(3)*IASSETS \quad (3)$$

Overall, the equation meets all the main rules for a good regression, but the number of validated explanatory variables is narrowed. The national competitiveness in the European Union is explained in proportion of 80% by the “human resources” and “intellectual assets” variables. The first dimension is positioned under the “enablers” category, while the second dimension is part of the “firm activity” category. Finally, equation 4 is expressing the influence that each independent variable has on the national competitiveness in the EU, represented by GCI.

$$GCI = 3.35255477 + 1.054443102*HR + 1.628281786*IASSETS \quad (4)$$

(0.005) (0.000)

Equation 4 indicates that if “human resources” or “intellectual assets” variables goes up by one unit, then the competitiveness at the national level in the European Union is predicted to increase 1.05, respectively 1.63. If all the variables are zero, then the national competitiveness is expected to be 3.35.

Case 2. The dependent variable is represented by the CCI and after applying the least square function the equation 5 is obtained.

$$\begin{aligned}
 CCI = & -1.63921215 - 0.0904485854*HR + 0.4977504665*RS + 1.143991693*FS - \\
 & (0.000) \quad (0.848) \quad (0.303) \quad (0.009) \\
 & 0.5784909089*FI + 0.6991365722*LENTREP + 0.8641023285*IASSETS - \\
 & (0.355) \quad (0.165) \quad (0.058) \\
 & 0.2217364123*INNOV + 0.799318014*EEF \\
 & (0.573) \quad (0.142)
 \end{aligned}$$

The results of the Ramsey test indicate that the multiple regression is correctly specified as linear. Further on, a value of 0.92 associated to R-squared highlights a very good regression, meaning that the country competitiveness in the European Union is mainly explained through the determinants included within the Innovation Union Scoreboard.

Similar to Case 1, most of the p-values associated to the independent variables are above 0.05 level, due to the same strong relationships between independent variables. As a consequence, after various variants of checking the potential connections between the independent variables representing innovation and the “country competitiveness index”, only two variables remained within the equation, as shown in equation 6.

$$CCI = C(1) + C(2)*FS + C(3)*IASSETS \quad (6)$$

Overall, the equation accomplishes all the main rules for a good linear regression, but the number of validated explanatory variables is very low. In this case, the national competitiveness in the European Union is explained in proportion of 83% by the “finance and support” and “intellectual assets” variables. The first dimension is positioned under the “enablers” category, while the second one is part of the “firm activity” category.

Finally, equation 7 captures the influence that each independent variable has on the national competitiveness in the EU, represented by CCI.

$$\begin{aligned}
 CCI = & -1.455910675 + 1.227930104*FS + 1.683188549*IASSETS \\
 & (0.003) \quad (0.000)
 \end{aligned} \quad (7)$$

Equation 7 reveals that if “finance and support” or “intellectual assets” variables goes up by one unit, then the competitiveness at the national level in the European Union is predicted to increase 1.23, respectively 1.68. Moreover, when the variables are considered to be zero, then the national competitiveness is expected to be -1.46.

Comparing the two cases, it can be noticed that there is similarity between them. Only two variables are confirmed in relation to the dependent variable and the positive impact of the “intellectual assets” variable on national competitiveness in EU is confirmed by both linear regressions. Consequently, no matter the dependent variable is represented by GCI or CCI, the intellectual assets have a positive impact on the national competitiveness in EU. On the other hand, the difference between the two cases is focused on the second variable that in the first case is represented by “human resources”, while in the second case by “finance and support”. Both variables have a similar positive impact on the national competitiveness in EU.

3 Conclusions

Initially, the paper is capturing an overall picture on innovation as a generator of competitiveness and highlights the positive connection between national competitiveness in EU and innovation. Further on, a snapshot on the main indicators used to quantify national competitiveness and innovation is included.

The second part of the paper is referring to the development of the corresponding multiple linear regressions between national competitiveness in EU and innovation and to their testing. The first case points out that human resources and intellectual assets have a positive impact on the national competitiveness in EU, represented by GCI. Regarding the other six dimensions that define innovation, the situation is unclear due to their corresponding probability level above 0.05 and the high correlation between the independent variables. The second case reveals a positive impact of the finance and support and intellectual assets on the national competitiveness in EU, represented by CCI. So, the determinants of innovation with the highest impact on the national competitiveness in EU out of the eight dimensions of innovation are represented by human resources, intellectual assets, and finance and support.

Consequently, stakeholders determined to implement and stimulate the innovation at the national level in the EU for a better level of national competitiveness should focus on three main directions, namely on developing human resources, by stimulating the increase of the number of new doctorate graduates, population completed tertiary education and youth with upper secondary level education, on intellectual assets, by supporting patent applications, community trademarks and designs, and on finance and support by a higher allocation of R&D expenditure in the public sector and through the stimulation of the venture capital investments.

Particularly, based on the suggestions of Arnold et al. (2009) some recommendations for stimulating the most relevant determinants of innovation in order to increase the competitiveness at the national level in EU regards the following:

- *developing the “human resources” dimension:*
- Investing in a national sustainable system of life-long learning in order to support the population along the educational process and afterwards;
- Developing an integrated system of higher education and qualifications that stimulate population complete the secondary, tertiary and doctorate level of education;
- Constant consultation with representatives of the market in order to adapt the university curricula in accordance to the employment market needs;
- Developing financial supporting schemes for each educational level, available through competition.
- *developing the “intellectual assets” dimension:*
- Providing incentives for the holders of patents, trademarks, designs in order to innovate in strategically relevant areas;
- Developing a network between the holders of patents, trademarks, designs and potential investors.
- *developing the “finance and support” dimension:*
- Increasing the R&D expenditure in the government sector and the higher education sector in order to support research in smart specialization areas;
- Stimulating venture capital investments in order to support enterprises with a high level of creation.

The current study has some shortcomings, mainly due to the high correlation between the innovation's determinants and the impossibility of validation of six out of eight independent variables. Future research directions imply conducting a similar research analysis at the regional level within the European Union, with Regional Competitiveness Index as dependent variable.

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Consumers' assessment of international "meta-services": the case of Airlines Alliance

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This paper presents a research on the "meta-services" delivered by networked firms and the way they are perceived by the customers. Our main hypothesis is that after experiencing such "meta-services" delivered by networked firms, the consumers synthesize their perceptions in terms of the perceived value of the network; furthermore, this assessment will largely determine their behavioural intentions. A quantitative survey allows verifying if the principal hypotheses are acceptable. This survey was conducted in the field of Airline passenger transportation, aiming to airline alliances in the context of long haul journeys. A structural equations model tested using the PLS-SEM method shows that satisfaction and perceived value of an alliance do explain passengers' future intentions, but that the value perception is by far the most powerful driver. It also shows how important to the consumers are some specific dimensions of an alliance, such as network geographical extension, co-ordination between the partners, shared information services or the smooth transits which influence the perceived quality of the alliance.

1 Introduction

The aim of this paper is to present the results of a research on the perceived value of "meta-services". We define this type of services as a grouping of multiple interlinked services provided by independent companies tied together by cooperation agreements. In "meta-services" situations, the consumers' choice is limited to the different integrated formulas offered by the networked firms. Consequently, these services will be partly delivered partly by firms not really chosen by the customers.

In services management research an evolution can be observed from simple single service activity towards more complex and integrated schemes. Such an evolution actually reflects the deep changes in the way some services are offered to consumers these days. Of course consumers continue to be serviced through 'servuction' processes (Eiglier; Langeard, 1987), but these processes often take place in more and more complex environments, due to the higher complexity of the customers' requirements but also to the growing complexity of the service providers' situation. Managing this new complexity leads service firms to develop networks, the reticular form being the most appropriate way to respond to the diverse needs expressed by the consumers (Gallouj; Gallouj, 1996). These networked service offerings can take various forms, ranging from controlled subsidiaries network to alliances with partner firms; they can cover diverse situations from the rather simple "service flowers" identified by Lovelock and *al.* (2008) to more or less large service "bunches" or clusters; Some researchers identify services constellation (Van Riel & *al.*, 2013) which differ from "meta-services" by the fact they are not produced by inter-firms cooperation.

Many "meta-services" belong to the transportation industry, because customers have to obtain a lot of information from the various independent service firms to travel in a satisfactory way. Similar situations can also be observed in the leisure services (holiday clubs, amusement parks, festivals or other popular events) though they face less complex situations due to the geographical concentration of most of the providers involved each time. The traditional way of analysing satisfaction or quality starts from the service experience of the core service and is generalised towards its peripheral services; it doesn't fit well with the whole service experienced by the customer in such contexts (Camelis & *al.*, 2010). Moreover, the customer loyalty cannot be correctly derived from such approaches. Hence, the networked services should be regarded as "meta-services" which requires a specific analysis to comprehend the consumers' behaviour.

This research is conducted within the specific context of airline alliances. Our approach is to place consumers in forefront and to study how the different networked services are synthesized by the consumer into a global perceived value attributed to the whole network.

This research tries to analyse how customers are experiencing and evaluating "meta-services" which are now part of the universal service consumption. The theoretical framework is followed by a description of the methodology and the theoretical model submitted to empirical testing. The exploratory results are then presented and discussed.

2 Theoretical Framework

Conceptual choices have to be made before collecting and analysing the opinions of consumers towards "meta-services", such as those offered by the airline alliances. Firstly it is useful to better understand how far "meta-services" are differing from simple services and then the growing complexity in services which tends to generalize in many service sectors and among them in the air transportation sector. The central question will be then examined: what

concept has to be privileged as the most pertinent when studying consumer attitude towards “meta-services”? The concept of value for the customer seems to be relevant in this context.

2.1 Simple versus networked firms' services

Researchers have always considered the question of the nature of services as an essential one, because it has statistical consequences for the economists or the geographers and managerial implications for management studies. Beside the definitions seeking to characterise the quintessence of service, as “as an act, a deed, a performance, or an effort” (Rathmell, 1966, 33), broader definitions including all the activities designed to meet a customers' specific need were proposed: “A *service* is an activity or series of activities of more or less intangible nature, that normally, but not necessarily, take place in interaction between the customer and service employees and/or physical resources or goods and/or system of the service provider, which are provided as solution to customer problem” (Grönroos, 1990, 27). To cast more light on these issues, Normann (1984) spoke of the ‘*service package*’, Eiglier and Langeard (1987) analysed a firm's service offering as composed of a basic service surrounded by peripheral services; more recently, Lovelock and *al.* (2008) used the concept of “*service flower*” to describe the arrangement of a core service with its peripheral services which increase its value and help a provider to be differentiated from competitors.

Eiglier (2004) stresses that these definitions are numerous, more or less complex, more or less inclusive, but that all give place to intangibility, which is an essential characteristic of services, as may also be considered the consumer's presence during the service “production”. Networked services have created new service situations for consumers and have recently called upon new approaches, both in marketing and in services management as well.

Gummeson (2005) argues that the relationships built by a company should be considered as a resource among the others classically identified by the services marketing. However he refers to the social networks more than to networks of service providers. Barile and Polese (2010) propose an integrated approach called “*Viable system approach*”. They describe a system connecting several elements, interdependent and communicating together; such a system can accomplish its goal through a selected activation of the relations between some elements. These relatively abstract developments can provide a general framework for analysing the contemporary services but they don't propose answers on how practically companies interlink their service operations and what impact it may have on the consumers.

When the service is offered by and within a network and in a complex context for the customer, as it is the case for “meta-services”, the issue appears to become more difficult to treat. However, it could be solved by multiplying dimensions of the analyses and whilst seeking to identify the different factors influencing the synthesis made by each consumer (Benedettini; Neely, 2012). With regard to the services offered by several firms which join or combine together to post a grouped offer, existing analyses are focused whether on the technical problems faced by the back offices or on the delimitations to be put at these alliances (Barile; Polese, 2010). The way in which these types of services are perceived by the consumer remains scarcely studied, as is the attitude she/he may develop towards these alliances. The customers, benefiting from the services offered by different companies, can make their mind on the quality of each service provider separately, but they will tend to integrate and synthesise these multiple experiences into a holistic final evaluation which they will probably attribute to the whole alliance.

2.2 The rise of complexity in networked services

When evaluating their experience of complex services the consumers will take into account very various aspects which are mainly related with the core services offered, the technology in use, the service brand and the price paid.

In “meta-services”, the service is not only co-created by the service provider and the customer as found in the basic definitions of services, but by numerous *interlinked* activities which mobilise the resources of other providers. These services appear to be much more complex with regard to their “production” and require the consumer to be much more involved. “Meta-services” use and combine information coming from several sources, with an objective to produce automated and harmonised services. Such processes are requiring proper collaboration between the participating actors to obtain a satisfactory service which can be split into separate stages, as indicated by Papazoglou and Dubray (2004, 11): “*Complex services are coarse-grained and involve interactions with other services and possibly end-users in a single or multiple sessions. Enterprises can use a single (discrete) service to accomplish a specific business task, such as billing or inventory control or they may compose several services together to create a distributed e-business application such as customised ordering, customer support, procurement and logistical support. These services are collaborative in nature and some of them may require transactional functionality*”. The consumers are not conscious of the back office processes. All that the consumers wish is to obtain a reliable service, delivered without any error or time delays, by a competent, courteous and responsive staff.

Information technology plays a pivotal role for supporting the networked services, but it also increases complexity. It constitutes the infrastructure of these multiple services and has hence become indispensable nowadays; however it generates a new kind of risks with the possibility of technological breakdowns that the front office personnel are rarely able to overcome. Moreover, the use of technology and the related innovations tend to enhance the performances commonly expected by the consumers. The benefits of using new innovating functionalities are rapidly assimilated by the consumers but they might be deeply disappointed if, by event, the technology fails when delivering the service.

A service brand plays a crucial part for the service firms, because it increases the trust of the consumers at the time of the purchase and helps the consumers to anticipate and understand what intangible services they will obtain. Different conceptions of the service brands were proposed, some suggesting that a service brand should be developed for each service concept like it is the case for products (O' Cass; Grace, 2003) when others propose to use the name of the service company as service brand (de Chernatony; Dall'Omo Riley, 1999). The later conception, seemingly the most frequently used, integrates the characteristics of the places where the services are delivered (service scape perspective) and those of the personnel in contact. The front office staffs should not only have an appropriate knowledge of the services offered but also all the required relational competencies, because consumers form their opinion during the interaction process with the personnel. Therefore, as stated by de Chernatony (2010), the service brand exists in the minds of the consumers *"by virtue of a continuous process whereby the co-ordinated activities across an organisation concerned with delivering a cluster of values are interpreted and internalised by customers in such a way that enhances their existence and, through the organisation responding to feedback, enhances the likelihood of brand success"*.

In a networked firms' environment, brands bring their share of complexity to the consumer. Indeed, service alliances group together under one name, several service companies which are using their names as service brands. The name given to an alliance cannot be considered fully as a brand, because it reflects different symbols and different attributes. A brand is supposed to reinforce the trust of the consumer who buys the service and facilitate the identification of the values of the company. However, in an alliance context, the lack of homogeneity of the quality of the services among the partners is likely to reduce the meaning of the collective brand.

The last important source of complexity in networked services comes from the prices. By buying a service, the consumers would like to have the feeling that they got something substantial for what they paid. The consumers can face daunting tasks in comparing the prices of services offered in a network; this is because of inherent intangibility in the services, but also because the partners of alliance may have different pricing approaches. Additionally, much of the price issues correspond to services which are bundled together by integrating for example the airport services, reservation, the in-flight services and the airport services at destination (Gillen; Morrison, 2003). Lastly, prices may frequently vary deeply because of the revenue management practices in sectors where capacity thresholds are a constraint as it is the case with airline companies.

2.3 Perceived value, Quality and Satisfaction

How do the consumers select all these elements to build their perceptions on their service experience? Which aspects are of primary importance for them? Which among them will lead to favour a solution as against the other? What sort of criteria will guide the consumers to evaluate the "meta-services"? To answer to some of these questions, Schneider and Bowen (1995) proposed businessmen to focus on three elements which are found to explain the success of leading firms: effective human resources management to build proper relations between service staff and consumers, excellent co-ordination of back office activities with the aim of satisfying customer expectations, attention paid on basic consumer needs for safety (physiological, psychological and monetary), self-esteem and justice.

Each one of these elements is treated separately by businesses and constitutes a sub-system (human resources, operations and marketing), the challenge being to make them properly work together in such a way that the consumer will not realise their existence during a normal service experience. This sort of challenge is carried out at a higher level in networked services: independent alliance partners have to co-ordinate their activities, harmonise the service standards and increase the safeness feeling of the consumers because these elements play a key role for the consumers' evaluations.

The assessments of the consumer mostly turn into a globalised synthesis and several concepts have been put forward by researchers to measure the consumer's opinion. Among these, satisfaction and quality have often been used as global measures of performance in services marketing.

These two concepts, satisfaction and quality, seems to be useful to our questioning but a third one, the perceived value of the services appears to us playing a pivotal role for understanding consumer perception of networked services (Woodruff, 1997; Zeithaml, 1988; Woodall, 2003; Grönroos, 2008). The context of "meta-services" explains this theoretical choice. In such a context, the customer deals with several quite identifiable service providers, each one with his brand, his image and his tradition. An alliance can appear as an entity which interposes between the service brands and the consumer. It can also be viewed as an engagement between companies which have teamed up to provide better services through the network. Therefore, it is crucial for the consumer to perceive the advantages that can be gained from this alliance formation and she/he can derive the value of the network, which will determine her/his satisfaction and behavioural intentions.

Generally, perceived value is described as a trade-off between benefits and costs for the user, both being taken in a broader sense, integrating many qualitative dimensions (emotional, psycho-social, comfort, perceived risk, feeling of being downgraded *etc.*) beside the monetary or financial aspects. The benefits are exerting a positive influence on the value, and the costs a negative one. The value concept makes it possible to put together the very various aspects taken into account by a consumer after experiencing a service and such an approach seems highly appropriate in a networked context. On the one hand, the customer analyses the benefits obtained due to the alliance system used, and on the other hand, the costs she/he had to pay (or to suffer from) to obtain them. However, numerous researches that have used the concept of customer value obviously mix together the value concept in itself and the various aspects that are taken into

account by the consumer. This arouses questions that have to be in debate: should these separate aspects be considered as dimensions of the value concept or as its determinants? A multidimensional option would imply that the content given to the concept will considerably vary according to the studied field. The perceived value concept would indeed gain a much larger scope with a direct measure. Such a direct measure can be envisaged by considering it as a latent variable from which direct consequences accept more easily to be measured.

3 Methodology, theoretical model and sample

The context of the airline alliances offers a unique observation field: numerous services are offered by numerous companies, in general independent from the ownership point of view, joined together by the need to offer passengers a complete and seamless service on different routes and destinations (Gudmundsson; Rhoades, 2001; Morrish; Hamilton, 2002). Alliances appear as a strategic response from flag carriers or traditional airline operators, as against the low-cost airline companies, which engage only on point-to-point routes. For now, the airline market seems to be dividing into two segments: low price offers on short or medium haul routes, whereas airline alliances are predominantly hovering over the long haul market (Tiernan & *al.*, 2008). However, this segmentation remains likely to evolve and the consumers will probably come to adjudicate it according to the value they perceive in each of the offered solution.

The consumers of long haul flights must manage a situation marked by complexity to synchronise the flights, to put together necessary information and to organise the steps of the flight journey. In such a context the analyses of services marketing and management literature appear as uncertain solutions to understand the consumer's perceptions and attitudes. Much is known and penned about the attitude of the consumer facing simple services, whose level of quality was preset, and delivered by a single and easily identifiable service provider. The perception of a service experience was indeed well analysed in what it acts on the consumer's evaluations, in terms of satisfaction, perceived quality or brand evaluation, which will impact the future behaviour of the consumer, such as re-purchase intentions, loyalty, recommendations or even trust towards a service provider.

This research was initiated by a preliminary exploratory study by carrying out semi-structured interviews in the aim of identifying the main variables to be measured in our quantitative survey (Janawade, 2013). The exploratory interviews, lasting each from 15 to 25 minutes, were conducted with eighteen airline alliance passengers from Europe, North America, South America, Asia and North Africa.

A research model survey was then built, based on the theoretical framework and on the themes which had emerged from the analysis of participants' discussions. A survey questionnaire was also established in order to obtain measures for the different variables identified.

3.1 The Research Model

Numerous determinants of the perceived value were identified and analysed by scholars in previous studies. In this model, it is assumed that the value of an airline alliance for its passengers has six determinants, which should directly influence the perceived value. Among these determinants, four are commonly used by researchers when modelling the perceived value of a service: the perceived service quality (Hypothesis H5), the benefits of psycho-social nature drawn from consumption (Hypothesis H9) and the financial advantages, which can be split into two aspects : price competitiveness (Hypothesis H8) and loyalty programs (Hypothesis H7).

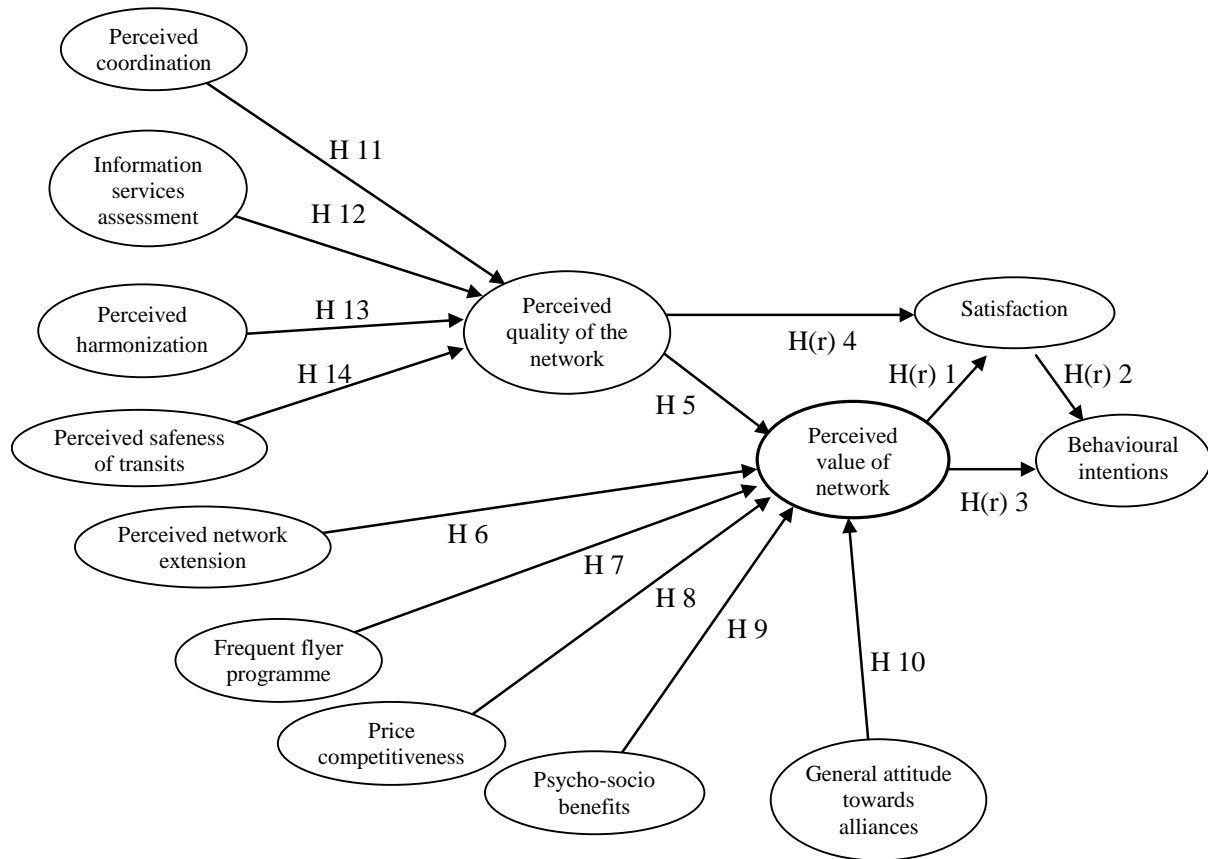


Figure 1. The research model: perceived value determinants and behavioural intentions of an alliance.

Two determinants were added due to the specific context studied: the extension of the network of flight routes and destinations is often put forward by airline alliances and should contribute to the value perceived by the customers (Hypothesis H6). Another influence is also to be expected from the general attitude developed by the users with respect to airline alliances as compared with the more traditional code sharing organisation between non-alliance carriers (Hypothesis H10). Indeed, an unfavourable general opinion about an alliance can emerge, if the consumer has the feeling that alliances are created with a sole aim of generating profits, rather than satisfying the consumers' needs. Such a negative attitude could prevent the customer from positively evaluating the value of the services offered by any airline alliance and should entail low quotations for the specific alliance flown. Four other determinants are introduced due to the specific context of the study: perceived coordination, perceived harmonisation, evaluation of information services and safeness of transits. Near concepts are acknowledged as contributors to the perceived quality of services and the model therefore assumes that the perceived quality should be a mediator between these above four mentioned determinants and the perceived value (Hypotheses H11 to H14).

The downstream part of the research model is much more traditional in marketing research and the concepts are not related to the specific context of airline alliances. It assumes that the perceived value exerts a positive influence on customer satisfaction (Replication 3), and that satisfaction influences in turn the future behavioural intentions of customers (Replication 2). In addition, the hypothesis stipulates that the perceived value also exerts a direct influence on the behavioural intentions (Replication 1). Moreover, perceived quality is traditionally considered as a powerful driver of satisfaction (Replication 4).

On the whole, thirteen variables are to be measured in this model; ten hypotheses and four replications are to be tested simultaneously. The general shape of the model will allow assessing the respective influences of perceived value, perceived quality and satisfaction as syntheses of service experience and drivers for behavioural intentions of the consumer.

3.2 The questionnaire and the survey

After being pre-tested in face-to-face with twenty frequent flyers of both sex, the questionnaire was adapted and made slimmer, making sure all questions would be understood the same way and could receive a easy and rapid answer (5 to 10 minutes). It consists of seventy two questions in total and all the items are to be quoted with a five points agreement Likert scale. The questionnaire was hosted online, using an internet survey website.

It begins with 8 questions about the participant's recent travel made within the framework of an airline alliance. The aim here is not to precisely describe the consumer's travel but to make sure that the respondents are well targeted to

give quality responses. The potential respondents were asked not to answer if they haven't recently (in the last 3 years) travelled with an airline alliance, using at least two different companies of this airline alliance during their journey.

Forty items are then proposed to the respondent's agreement to obtain her/his evaluations precisely relating to the concerned alliance. A dozen other questions were asked to identify the respondent's evaluative judgement about this experience: satisfaction, the value she/he attributed to the services delivered by the concerned alliance and her/his future behaviour. Her/his opinion towards airline alliances in general as compared with other independently operating non-alliance carriers was also measured. The remaining questions were devoted to specify the individual demographic characteristics (age, sex, profession, *etc.*) of a respondent and her/his flyer profile. Both types of variables may play a moderating role in the research model.

As far as possible, the formulation of the items followed those which had already been tested in previous studies on customer satisfaction, perceived value, repurchase intentions and on the evaluation of a service experience. The items were adapted as much as possible to the context of airline alliances to support the quality of answers.

3.3 The sample

The target population of our survey is constituted by passengers having a recent experience of travelling with an airline alliance, for a long haul flight with at least one stopover and two different carriers of the same alliance. Furthermore, quality answers were expected from travellers having developed a particular interest about long haul flights, because this consumer profiles are likely to act as opinion leaders in the market, a role with growing significance due to the internet development. People travelling often for professional reasons were privileged in the survey and answers were sought from university professors and foreign advanced students on the one hand, and, on the other, from international businessmen. The firsts were contacted through systematic emailing asking for help and answers, the latter through personal relations and through internet forums dedicated to air travels. This explains the strong proportion of professors and businessmen participating in the sample. Such a sampling can be considered as a convenience one but the characteristics of the target are hardly known and this compels to sacrifice external validity in order to obtain relevant answers.

The sample comprises about four times more men than women. Actually, women are less frequent in the people contacted and men are seen to travel more than women for professional reasons. The age distribution seems to be balanced as it leaves some space for younger and older people. The occupational profiles of the respondents are clearly influenced by the survey method, which privileged two professional environments. The business professionals, who travel frequently, having lots of travel experience, were found to give differentiated but experienced opinions. The incomes of the respondents are distributed in a rather unbalanced way. On one side of the spectrum, the high income group counts for about half of the answers and, on the other, the low income group represented by students for a sixth. The geographical origins of the respondents were rather open. However, a majority are from European countries, followed by North Americans and Australians. The rest of the world is definitely poorly represented, which limits the external validity of the results, while improving the homogeneity of the answers obtained.

According to their usage of airlines the respondents in this survey appear to have a good practice of airlines, which was expected to obtain answers only on behalf of people able to answer with a good knowledge on airline alliance services. Thus the sample represents some sort of a homogeneous set of people. More than three quarters of the respondents are found to have registered to an alliance carriers' loyalty program and more than half of the respondents declare themselves as being passionate about travelling with airlines. The sample thus gathers opinions from passengers, who have a certain level of information and experience about flying with an airline alliance.

Considering the travels which were used as reference by consumers to complete the questionnaire, it should be noted first that nearly half of the responses are concerning a specific alliance (Star Alliance). Indeed, this alliance has a greater market share than other players in airline industry, but trips made with Skyteam flyers are noteworthy under-represented in the sample (17 percent of answers).

More than eighty percent of the travels were long haul flights, lasting more than seven hours. In 44 percent of the cases, the long haul flights had only one stopover and most respondents (79 percent) travelled with two different alliance carriers belonging to the same alliance. The travels were related to professional work (study or business) in 46 percent of the cases, the rest being for leisure or tourism. In 55 percent of the cases, the flight tickets were paid by the respondents themselves and 35 percent by the respondents' organisation. This can explain why 47 percent of the respondents travelled in economic class, while 36 percent had the opportunity to travel on business class.

3.4 Data Analysis method

In this paper, we are trying first to verify that the variables identified by the qualitative survey actually exist in the respondents mind, that their measure by the selected items is acceptable and that they can be related together in a structural model. With respect to the data analysis, the Partial Least Squares, structural equation modelling (PLS-SEM) approach was used to validate a structural equations model describing how the diverse opinions expressed by the consumer could predict her/his behavioural intention, so as to reveal the respective weights of each determinant.

The PLS-SEM method is appropriated for exploratory studies using relatively modest size of sample. It is a multivariate analysis technique making it possible to test structural equations. It is a general method to estimate a

research model comprising of latent variables measured by numerous items, as is the case here. This method allows simultaneously taking into account all the variables and all the relations tested by the research model. PLS approach has been found to be very robust (Chin, 1998) and require only few statistical conditions for the data. It is also recommended by Wold (1982) for the predictive-causal analyses of complex problems, whose theoretical framework remains limited. For low size samples, the precision of the estimated parameters can be obtained whilst using the bootstrap method which randomly generates a very large number of alternative samples from the initial data collected.

The PLS-SEM analysis followed here refers also the two steps approach recommended by Hair and *al.* (1998) for the structural equation modelling: before analysing the structural equation model describing the relations between the variables, the measurement constructs of the model are analysed to check if the various latent variables created are under acceptable conditions. This step consists of evaluating the statistical quality of the measurement model and is necessary to legitimate the analysis of the structural model whose relations are examined and discussed as compared with the initial assumptions.

4 Results and findings

The confrontation to the empirical data collected leads to revise some points of the proposed conceptual model. These changes are presented first and then how the main variables were measured. The measurement model is analysed next and at last the structural model and the findings of this exploratory stage of the research.

4.1 The revised model

Among the first results of the empirical phase of the research, three are of some importance as they lead to slightly adapt the theoretical model, cancelling two variables and the related hypotheses, and changing the destination impact of two explaining variables. However these changes do not disturb the general shape of the model which highlights the central role played by the perceived value in the context of networked services.

The first change is derived from the observation that the four items that should have measured the benefits of psycho-social nature didn't produce an acceptable measure for a single latent variable: at least two dimensions were to be found there but none was measured in an acceptable way. Furthermore no significant relationship could be established with perceived value or satisfaction. Indeed, this could have been expected as this sort of benefits are closely tied to the brand image of a service provider and, as mentioned above, alliances are not fully service brands but mix different carriers brands introducing confusion into the passengers mind. The perceived psycho-social benefits were thus withdrawn from the model entailing the hypothesis H9 to be also dropped from the analysis.

Furthermore, price competitiveness didn't prove to be tied to any of the variables of the model, though it was measured in an acceptable way. This was also observed when limiting the field to the 169 passengers having paid their ticket. Seemingly, the price has become difficult to be assessed by consumers, due to the generalization of revenue management practices in the transportation sector. Therefore the hypothesis H8 was rejected and the variable was withdrawn from the revised version of the model.

The third change states that the relation between perceived harmonisation and perceived value, which was assumed as being mediated by the perceived service quality, should be a much more downstream one, influencing satisfaction and not at all the perceived value. The hypothesis H13 was therefore revised. At last, the empirical analysis suggests that the network extension does not exert a direct influence on the perceived value. Nevertheless it directly impacts the customer's assessment of the frequent flyer program of an airline alliance. Furthermore a direct link is to be observed with the behavioural intentions: actually, a wider offer meets the needs of a larger number of potential travellers. The hypothesis H6 was thus modified in the tested model.

4.2 The main variables and their measurement

The analyses of perceived value call upon many determinants which result in relatively high number of variables to be measured; a few more variables are requested due to the specific context of the research and two more variables (satisfaction and behavioural intentions) are also needed as they are immediate consequences of the perceived value and give sense to the whole modelling. Overall, 11 variables were used in the conceptual model and none can be measured directly. All are thus latent variables and each has to be assessed by a set of items selected as measuring directly assumed consequences of the latent variable. The precise formulation of the items can be found in Table 4 given in Appendix; in Table 5, in Appendix, are given the items that had to be rejected after empirical testing.

The purpose of the model is to analyse how the identified determinants combine to give birth to satisfaction, perceived value entailing behavioural intentions. Correctly measuring these three target variables is therefore essential to the quality of the model. These three latent variables are thus worth of being more precisely presented.

Satisfaction and behavioural intentions have been regularly featured in previous marketing studies dedicated to the consumers' behaviour. The measurement of the behavioural intentions is sought by asking consumers if they consider they are likely to re-purchase the services of the airline alliance and if this would result from a preferential choice. Another aspect of this attitude lies in consumers spreading a good word of appreciation about the service provider or

recommending it to their friends. These three items are well correlated in the data base and constitute the measurement scale of the consumer's behavioural intentions.

The satisfaction of the user can be measured by a direct question about her/his global feelings with the experienced service. Satisfaction can also be measured indirectly by seeking consumers responses in terms of pleasure of consumption, service provider's ability to meet the customer requirements, or by asking an evaluative judgement on the choice made when purchasing the service. Though the four items are well correlated together, the first one differs slightly from others which were asked at the end of the questionnaire. The last three were only kept for measuring the customers satisfaction with her/his experience of travel within the alliance, increasing the level of the Chronbach's alpha from 0.79 to 0.87 and enhancing the share of the total extracted: 79% instead of 64% with the 4 items.

Despite its interest, the measurement of the perceived value remains largely in an unsatisfactory state. Scholars used mainly small scales, comprising one or two items, sometimes mixing perceived value with satisfaction. Items have to be directly referred to perceived value and not to satisfaction. It is commonly stated that, the greater the perceived value, the better the service provider is evaluated because of the feeling of getting a lot for the price paid. Symmetrically consumers should accept to pay a little more to obtain a service she/he considers of greater value. As a conclusion, a most valuable service will be seen by the consumer as fulfilling her/his true interest. The three selected items apparently give the first place to the financial aspects involved in the valuation process. But they actually stress the comparison between the price paid and all the various other aspects that are taken into account by the consumer, such as convenience, comfort, courtesy etc.

4.3 The measurement model

The measurement model was evaluated using the XLSTAT 2013 (Addinsoft) software program. It is evaluated by the indicators of convergent validity (Average variance extracted), of composite reliability (Dillon Goldstein's Rho) which are presented in table 1.

Table 1. Composite reliability, uni-dimensionality and convergent validity.

<i>Latent variables (number of items)</i>	<i>Dillon- Goldstein's Rho</i>	<i>First eigen value</i>	<i>Second eigen value</i>	<i>Average variance extracted</i>
<i>REBUY: Behavioural intentions (3)</i>	.929	2.221	.274	.803
<i>SAT: Satisfaction with the alliance (3)</i>	.931	1.640	.230	.817
<i>PV: Perceived value of the alliance (3)</i>	.918	2.355	.325	.773
<i>HARM: Perceived harmonisation (4)</i>	.888	2.912	.634	.662
<i>COOR: Perceived co-ordination (4)</i>	.874	2.082	.529	.627
<i>INFO: Information services (3)</i>	.900	1.733	.403	.752
<i>EXT: Perceived network extension (3)</i>	.880	1.194	.330	.713
<i>SAFE: Safeness of transits (4)</i>	.906	2.121	.580	.703
<i>QUAL: Services quality (4)</i>	.867	2.106	.566	.619
<i>FFP: Frequent Flyer Program (3)</i>	.823	1.647	.695	.611
<i>GEN: General attitude towards alliances (4)</i>	.908	2.371	.409	.708
Minimum threshold acceptability	> .7**	> 1.0	< 1.0	> .5*

*according to Fornell & Larcker (1981)

** according to Nunnally (1978)

One can notice that all the latent variables are complying with the desired thresholds. The discriminant validity is also examined by making sure that the coefficient of determination R^2 between the variables are lower than the average variance extracted when constituting each variable. Table 2 shows that all the latent variables are also satisfying this condition. Correlations obviously exist between the various variables but remain always at a lower level than the average variance extracted, which in turn defines each latent variable. The analysis of the measurement model thus confirms that the variables can be used to model their relationships with PLS-SEM.

Table 2. Discriminant validity of items measuring latent variables.

Squared correlations between variables and comparison with the average variance extracted (Rho)(given in the diagonal and bold)											
	<i>REBUY</i>	<i>SAT</i>	<i>PV</i>	<i>HARM</i>	<i>COOR</i>	<i>INFO</i>	<i>EXT</i>	<i>SAFE</i>	<i>QUAL</i>	<i>FFP</i>	<i>GEN</i>
<i>REBUY</i>	.803										
<i>SAT</i>	.626	.817									
<i>PV</i>	.758	.577	.773								
<i>HARM</i>	.116	.171	.129	.662							
<i>COOR</i>	.269	.330	.275	.259	.627						
<i>INFO</i>	.184	.219	.189	.091	.288	.752					
<i>EXT</i>	.291	.327	.214	.012	.143	.080	.713				
<i>SAFE</i>	.199	.275	.213	.221	.483	.245	.115	.703			
<i>QUAL</i>	.384	.401	.348	.084	.323	.271	.268	.363	.619		
<i>FFP</i>	.350	.324	.333	.114	.246	.243	.235	.226	.377	.611	
<i>GEN</i>	.326	.298	.340	.111	.200	.122	.189	.155	.237	.216	.708

Minimum threshold acceptability *: R² < average variance extracted (Rho)

Minimum threshold acceptability *: $R^2 < \text{average variance extracted (Rho)}$

* according to Fornell & Larcker (1981)

4.4 Findings from the structural model

The revised edition of the structural model as illustrated in Figure 2 was evaluated using the same software program, which was used for the measurement model. This model exhibits its overall explanatory power and the estimated coefficients for each relationship.

The latent variables are figured by ovals, and the items used by rectangles. The share of the variance (R^2) explained by the model is written inside the ovals and, of course, exogenous latent variables show no values for R^2 . The statistical accuracy of the coefficients measuring the relationship between the variables is figured by asterisks placed next to the estimated coefficient. It was established by the bootstrap technique as mentioned above: a thousand of sub-samples, with 150 answers each, were automatically created by randomly deleting observations from the initial database. The T tests obtained do accept not normally distributed data. All relationships tested appear significantly different from zero with a probability higher than 95%, which is the maximum confidence interval recommended by Cheung and Lau (2008). Moreover, among the 13 tested relationships, 10 have a probability greater than 99% and even 99.9% for five. The hypotheses are therefore not contradicted by the data collected. Overall, the goodness of fit of the model appears to be satisfactory: the calculated indexes are over the commonly used thresholds of .9 (or .36 for the absolut index). The predictive power of the research model appears to be fairly good: the behavioural intention of the consumer, which is the target variable for our study, has nearly 81% of its variance accounted by the proposed model, which is very satisfactory, considering the data collection method and the various contexts of use of airline alliances in the data.

The model appears as rather complex and it contains 16 cases of a variable playing as a mediator between two others. All were tested using an improved Sobel test proposed by Preacher and Hayes (2004) and all were confirmed as statistically significant, most accounting for more than 50% of the explained variance. The two direct impacts coexisting with an indirect one were confirmed: Perceived value impacts behavioural intentions directly and through satisfaction. Services quality influences satisfaction directly and through perceived value. No other direct link could be accepted when incorporated into the general frame of the model.

Above all, this model shows that the central role of perceived value is not invalidated by empirical data collected. Another important hypothesis appears consistent with the data: the perceived quality of an alliance plays a mediating role for a certain number of aspects specific to this context, which are therefore partly summarised by this variable. All the research hypotheses that were maintained in the revised model seem also to be acceptable. The changes that had to be made to comply with the first empirical testing are of course confirmed. It stresses firstly the importance of the frequent flyers' program which exerts a direct influence on the perceived value and identifies the double influence of the perceived extension of the flights network. Secondly, the perceived harmonisation does not come into play for influencing the perceived value. However, it seemingly influences the consumer satisfaction with the airline alliance, impacting thus indirectly the purchase intentions.

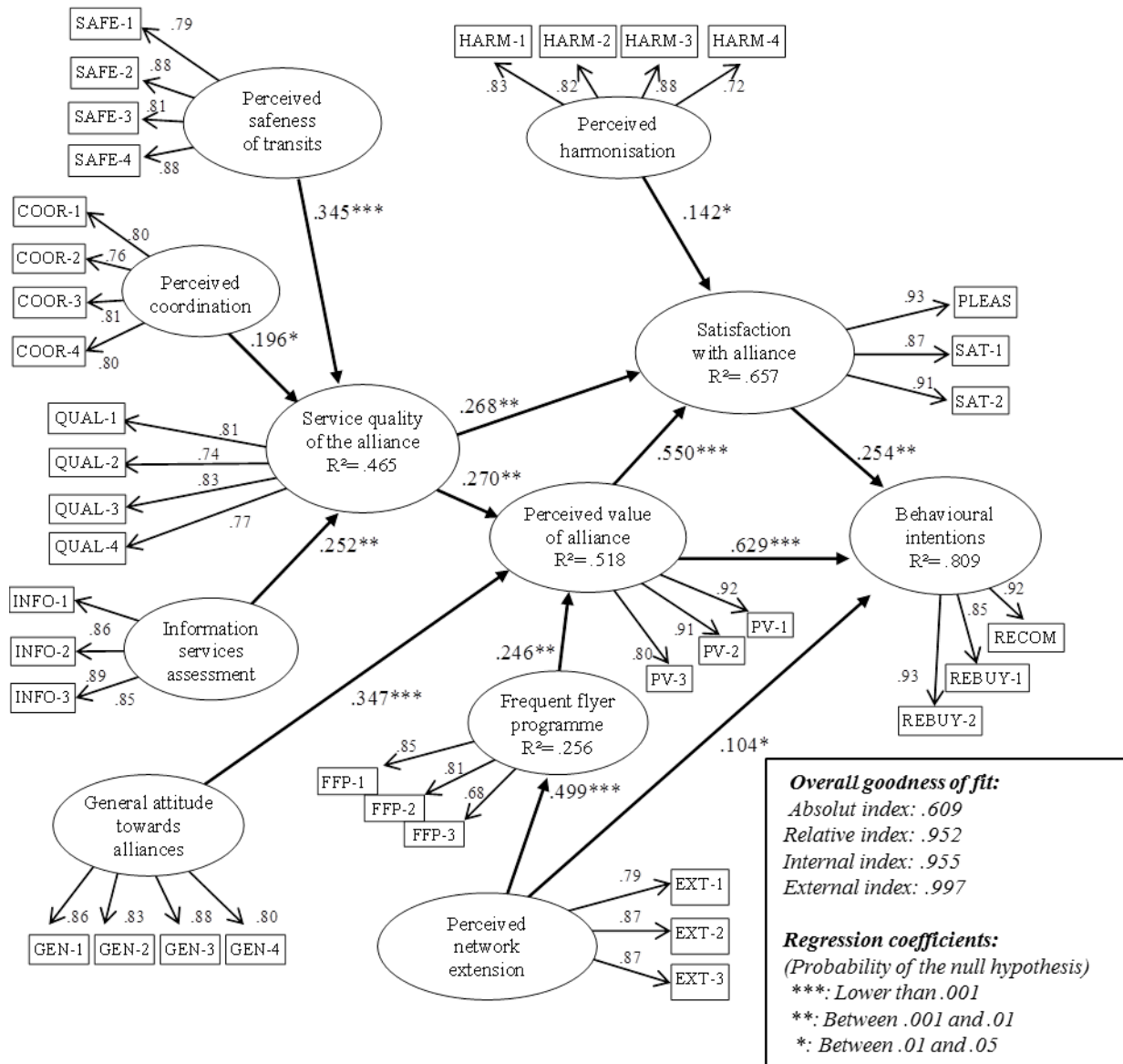


Figure 2. The structural model.

If we compare the coefficients organising the structural model, it appears that the most significant relationship is found directly between perceived value and behavioural intentions. Moreover this direct relationship is reinforced by an indirect relationship through the consumer satisfaction. This constitutes probably the main result of the research. The model shows indeed that consumer satisfaction is also narrowly tied to perceived value.

The sensitivity of the model to the context has not been extensively studied at this stage of the research. However, comparisons have been carried between sub-groups counting more than one hundred of respondents: higher incomes *versus* others, most frequent air travellers *versus* lesser, people having travelled for leisure or tourism *versus* professional reasons, people having paid their ticket *versus* trips charged to their organisation. They show that statistically significant changes in the path coefficients remain rare and do not affect the main conclusions that could be drawn from this analysis. The main change is that the perceived harmonisation between the alliance partners plays no significant role for the most frequent flyers (at least 10 flights per year).

Table 3. Direct, indirect and total influences of variables on behavioural intentions.

Latent variables	Direct	Types of influence:		Altogether
		Through perceived value	Through satisfaction	
PV: Perceived value of the alliance	.631	--	.140	.773
QUAL: Services quality	.000	.170	.104	.274
GEN: General attitude towards alliances	.000	.218	.048	.266
SAT: Satisfaction with the alliance	.253	.000	--	.253
EXT: Perceived network extension	.104	.077	.017	.198
FFP: Frequent Flyer Program	.000	.155	.034	.189
SAFE: Safeness of transits	.000	.059	.036	.095
COOR: Perceived co-ordination	.000	.043	.027	.070
INFO: Information services	.000	.033	.021	.054
HARM: Perceived harmonisation	.000	.000	.036	.036

Table 3 recapitulates all the direct and indirect influences that can be read in the model from the point of view of the customer's behavioural intentions. Apart from the perceived value overwhelming influence, three other powerful determinants are influencing the consumer's future attitude towards the alliance: The perceived service quality of services, the opinion towards alliances in general and satisfaction from the services obtained. Satisfaction apparently largely depends on the perceived value, and the attention of the researcher should be drawn on the two other drivers which are direct antecedents of the perceived value. Perceived quality is a rather classical way for the consumers to synthesize their perceptions of many "meta-services": safeness of the connections at transit airports, co-ordination among the alliance carriers and the information systems they could use. What about the general attitude towards alliances? It can be assumed that previous experiences with alliances, at least partly determines this opinion which thus could be the result of a vicious or virtuous circle. It expresses an attitude developed by a consumer towards the "meta-services" that can be offered by firms working together in a same alliance: are they expected as useful and appreciated or does the customer prefer to remain fully free to choose the services and the providers she/he wants?

Two variables come next with comparable weights: the perceived network extension of the network and the frequent flyer program. The influence of network extension is twofold: on the one hand it acts directly on the behavioural intentions of some types of passengers. A wider offer always provides more opportunities to be taken into account by potential users. On the other hand it enhances the value of the frequent flyers' program and may be of importance for some types of customers. Apart from these results, this study also suggests that, interestingly, the brand image and the pricing policies are not clearly understood by passengers and don't affect either the perceived value of an alliance or the behavioural intentions.

5 Conclusion

This study sheds light into issues, which were not addressed in literature before. Therefore these results should be considered as exploratory due to the relative newness of the context investigated: as far as we know, it is the first empirically validated approach to the consumer perception of "meta-services" offered by separate firms cooperating together.

With respect to managerial implications, the primary interest of this research is to place the consumers in forefront to understand their concerns of the networked service. Whilst concentrating on the organisational models and the inter-firms agreements, the managers of alliance carriers are sometimes likely to overlook consumer perception of the services offered. This research should draw the attention of managers on the concerns which are of importance to their consumers. The extension of the network appears also to be a major concern for the passengers. Well-co-ordinated operations between partners, transits and connections made safer and well organised information services are expected by the consumers and directly impact the services quality of an alliance as perceived by its users.

From a more theoretical point of view, this research is a first step to provide a fair analysis of the consumers' perceptions of "meta-services" in an airline alliance context. The sector of transport and tourism is embracing more and more networked services as key ingredient for its exponential growth. This research shows how important it is to take into account new variables when networked services are in concern: variables specific to the common organisation are valuable for understanding the consumers attitude and behaviour.

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Appendix

Table 4. Recapitulation of variables and measuring items (standardised loadings in brackets).

<i>5 level scales: 1 Strongly disagree to 5 Strongly agree</i>	
REBUY: Behavioural intentions	
REBUY-1: I will travel again with this alliance in the future (.844)	
REBUY-2: Whenever I have a to choose, I will certainly prefer this alliance over others (.927)	
RECOM: Surely, I will warmly recommend this alliance to friends (.916)	
SAT: Satisfaction with respect to the alliance	
SAT-1: It was a wise choice to fly with this alliance (.876)	
SAT-2: This alliance provided me all the services that I needed (.903)	
PLEAS: It was a pleasure to fly with this alliance (.931)	
PV: Perceived value of the alliance	
PV-1: Travelling with this alliance is worth it, even if it costs a bit more (.923)	
PV-2: It is my true interest to travel with this alliance (.912)	
PV-3: The services offered by this alliance provide good value for money (.794)	
EXT: Perceived extent of the network	
EXT-1: This alliance facilitates travels to most parts of the world (.786)	
EXT-2: This alliance provides convenient schedules and a wide variety of flights (.873)	
EXT-3: This alliance provides easy access to the large world cities (.858)	
FFP: Frequent Flyers' Program assessment	
FFP-1: With this alliance passengers are well rewarded for their loyalty (.854)	
FFP-2: With this alliance frequent flyers get attractive bonuses (0.808)	
FFP-3: The airlines belonging to this alliance accept to redeem and use frequent flyers points obtained from any alliance member (.658)	
QUAL: Perceived quality of the services offered by the alliance	
QUAL-1: This alliance pays attention to the passenger's needs all along the trip (food, drink, comfort, health and hygiene) (.804)	
QUAL-2: This alliance provides good in-flight and on-ground services (.736)	
QUAL-3: This alliance pays attention to the comfort and well-being of passengers during transits (.837)	
QUAL-4: With this alliance it is possible to rest comfortably in an airport lounge. (.765)	
GEN: General attitude towards alliances	
GEN-1: Travelling with an airline alliance for a long trip is always better, when possible (.857)	
GEN-2: Travelling with an airline alliance for a long trip is always better for the same pricee (.822)	
GEN-3: Travelling with an airline alliance for a long trip is worth it, even if it costs a bit more (.881)	
GEN-4: Travelling with an airline alliance for a long trip allows better organising the trip (.795)	
HARM: Perceived harmonisation of the partners of the alliance	
HARM-1: The airlines belonging to this alliance offer very similar advantages, regardless of the company having issued the ticket (.832)	
HARM-2: This alliance ensures that the quality of the travel remains the same irrespective of the airline company flown (member of the alliance) (.814)	
HARM-3: The airlines belonging to this alliance provide services with very similar quality standards (.874)	
HARM-4: The airlines belonging to this alliance offer very similar frequent flyer program (.710)	
COOR: Perceived coordination between partners of the alliance	
COOR-1: This alliance provides smooth connections at transit airports (.795)	
COOR-2: Travelling with this alliance assures easy flight connections (.762)	
COOR-3: The airlines belonging to this alliance are very well coordinated to avoid any reservation problems (.803)	
COOR-4: The airlines belonging to this alliance are very well coordinated to avoid any baggage problems (.800)	
INFO: Perceived advantages in terms of information offered by the alliance	
INFO-1: The different channels used by that alliance (website, call centres, self-help kiosks) are useful and convenient ways to obtain flight information (.861)	
INFO-2: The different channels used by that alliance (website, call centres, self-help kiosks) are useful and convenient provide up-to-date and consistent flight information (0.886)	
INFO-3: The different channels used by that alliance (website, call centres, self-help kiosks) are useful and convenient offer very convenient ways to register air miles (0.846)	
SAFE: Safeness of the transits	
SAFE-1: This alliance well informs transit passengers on how to catch their connecting flights in time (.782)	
SAFE-2: In case of flight or connection problems, this alliance well informs passengers on how they will continue their travel (.872)	
SAFE-3: In case of flight or connection problems, this alliance effectively assists passengers (.812)	
SAFE-4: In case of flight or connection problems, this alliance makes proper arrangements to convey passengers to their final destination (.875)	

Table 5. Recapitulation of items that had to be rejected following the empirical study.

*If not stated otherwise these items are measured with a 5 level agreement scale ranging from:
1 Strongly disagree to 5 Strongly agree*

1) Rejected variables

PSY: Psycho social benefits drawn from travelling with the alliance

PSY-1: With this alliance all passengers are treated equally with respect.

PSY-2: Travelling with this alliance gives a good image.

PSY-3: Travelling with this alliance improves the way you are perceived by other people.

PSY-4: The airlines members of this alliance have rather prestigious names.

Variable is rejected due to poor convergence and no significant relation with other variables in the model.

PRICE: Price benefits drawn from the alliance

PRICE-1: With this alliance the ticket pricing makes travelling more affordable.

PRICE-2: This alliance provides attractive savings on airfares.

PRICE-3: This alliance provides attractive savings when reserving hotels, cars, etc.

Variable is rejected despite an acceptable measurement, but no significant relation with other variables in the model.

2) Rejected items

SAT: Satisfaction with the alliance

SAT-3: Overall, this travel experience left you : (1 Very dissatisfied to 5 Very satisfied).

This direct measure was asked at the very beginning of the questionnaire.

It slightly differs from the 3 other satisfaction items asked at the end, after recalling many precise aspects of the journey.

Item rejected to enhance the convergent validity of the scale.

PV: Perceived value of the alliance:

EXC: I would rank this alliance among the best in terms of excellence.

Item rejected as not specific to perceived value, mixed with quality and satisfaction

EXT: Perceived extension of the network

EXT-4: This alliance provides a wide choice of options for selecting transit airports.

EXT-5: This alliance provides an extended network of flights to numerous destinations.

Network density appears to be a separate dimension in customers' mind.

A third item would have been necessary to introduce this variable into the model.

QUAL: Perceived quality of the alliance's services

QUAL-5: The airlines belonging to this alliance provide attractive services to passengers.

QUAL-5 mixes two aspects (harmonisation & quality), being specific to none.

QUAL-6: With this alliance priority boarding is possible.

Relationships of QUAL-6 with other QUAL items are weak.

COOR: Perceived coordination between alliance partners

COOR-5: The airlines belonging to this alliance accept to redeem and use frequent flyers points obtained from any alliance member.

COOR-5 mixes two aspects (co-ordination & frequent flyers' program) being specific to none.

COOR-6: This alliance ensures that passengers' requests (dietary, seating, etc.) are properly shared between the different airline companies involved.

COOR-6 is poorly related with other COOR items

SAFE: Safeness of the travel / transits

SAFE-5: This alliance provides peace of mind during the trip.

SAFE-6: The airlines belonging to this alliance are selected as being highly reliable.

SAFE-7: Travelling with this alliance reduces the risk of being disappointed with a trip.

The safeness of the whole travel was initially aimed, but the transit alone is considered in the passengers' mind.

INFO: Information services assessment

INFO-4: This alliance ensures that passengers will have easy access to the relevant information in their transit airports.

Item rejected as it mixes two aspects (safeness & information), being specific to none.

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Stakeholder integration for service innovation in German medium-sized enterprises

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Building on service systems and stakeholder integration literature, this multiple case study explores from a service-dominant-logic perspective, which internal and external stakeholders are being integrated in service innovation, in which stage of the process and in which mode. It identifies that only internal units are integrated in the mode of mutual co-creation – other stakeholders are integrated reactively. The paper discusses the indirect integration of customers and highlights interdependencies of stakeholder integration as a challenge for service innovation management.

1 Introduction to the topic

Building upon service dominant logic (SDL), service innovation is recently being discussed as a multi-dimensional concept embedded in service systems (Lusch, 2006; Maglio, Vargo, Caswell, & Spohrer, 2009; Vargo, Maglio, & Akaka, 2008). Since service researchers are elaborating about service innovation in interdependent service systems, networks and ecosystems, the selection, management and interaction of internal and external value co-creators for service innovation is gaining attention in recent research (Carlborg, Kindström, & Kowalkowski, 2013; Smith & Fischbacher, 2005).

In the past, research has put high emphasis on the possibilities and practices of stakeholder integration for specific groups, often in isolated cases of service organisations (Kristensson, Matthing, & Johansson, 2008). A variety of scholarly papers show the differences between specific types of users for innovation and describe either external (Frow & Payne, 2011; Mention & Asikainen, 2012) or internal stakeholder integration only (Melton & Hartline, 2012). But from a service systems' point of view, there is a strong demand to know more about stakeholders and their roles in interdependent systems, consisting of both internal and external stakeholders (Kindström, Kowalkowski, & Sandberg, 2013; Tossavainen, 2013). Additionally there is a need to find out about how this integration is practiced in reality (Ettlie & Rosenthal, 2011; Rusanen, Halinen-Kaila, & Jaakkola, 2014), especially in business-to-business settings, and other industries than core service organisations¹⁶⁰ (Carlborg et al. 2013; Ostrom et al., 2010).

Building upon scholarly work that investigated where and how specific internal or external stakeholders can be integrated in service innovation (e.g. Alam & Perry, 2002; Jonas, Möslin, & Roth, 2013; Perks, Gruber, & Edvardsson, 2012; Perks & Riihela, 2004), this study seeks to gain a better understanding of stakeholder integration, representing an interdependent system of both, internal and external stakeholders.

With an explorative multiple case study approach, this paper aims to answer the questions a) which actors from inside and outside the organization are being integrated throughout the stages of SI, b) in which mode the integration is happening. The research field of non-core service innovation was chosen since the multi-dimensionality in areas such as software development and manufacturing is expected to be high and yet, there are only few empirical studies investigating service innovation processes in this context (Carlborg et al., 2013).

The paper is structured as follows: after an introduction to the status-quo of research on service innovation in service systems, stakeholder integration and the modes of stakeholder integration, the multiple case study methodology will be described, followed by a presentation of the empirical findings. The paper ends with a discussion and conclusion, and an outlook for further research.

2 Theoretical background

2.1 Service innovation in service systems

From a SDL perspective, service innovation is a multi-dimensional process that aligns internal and external actors, their knowledge and resources as parts of interdependent service systems (Kindström, Kowalkowski, & Sandberg, 2013; Lusch, Vargo, & Tanniru, 2009; Vargo, 2008). The SDL implies that different actors of a service system are creating value by contributing their resources, skills and knowledge for service (Lusch & Vargo, 2014). It puts the user of the service, the beneficiary, in the center of service since the value of a service offering is always determined by the beneficiary (Vargo, 2008; Vargo et al., 2008).

The multi-dimensionality, along with the fact that a service innovation affects various dimensions of a service organisation and the service system it is embedded in, is gaining a broad support in research (Agarwal & Selen, 2011;

¹⁶⁰ Non-core service industries, such as knowledge-intensive domains like engineering and software, are often characterized by ad-hoc service development and a lack of clear service strategies, yet service innovation in these domains is being highly demanded and gaining attention amongst scholars, see e.g. Mathieu, 2001; Raddats & Kowalkowski, 2014; Kindström, & Brehmer, 2011.

Kowalkowski et al., 2012; Maglio et al., 2009; Rubalcaba et al., 2012; Smith & Fischbacher, 2005; Vargo et al., 2008). An example for the evidence of interdependencies is shown by Perks and Riihela (2004) where conflicts occurred internally due to the integration of outside suppliers. Whilst multi-dimensionality and potential interdependencies add to complexity for managing service innovation, it is also a competitive advantage differentiating and preventing imitation from competitors (Janssen, Castaldi, & den Hertog, 2013).

Already the organization itself is a system with different internal stakeholder groups. Different departments, disciplines and functions constitute actors in the service system that potentially have to be considered for integration (Carlborg et al., 2013; Kowalkowski, Witell, & Gustafsson, 2013). The alignment of the organizational resources, especially between those actors that innovate and design and those that deliver services (Payne, Storbacka, & Frow, 2007), is found to be a prerequisite to prevent market failure, together with a strategy and value creation for the customer (Edvardsson, Meiren, Schäfer, & Witell, 2013). Internal and external stakeholders participate in the co-creation of value and value propositions (service innovation) with their personal engagement and experiences (Ramaswamy & Gouillart, 2010).

2.2 Stakeholder integration in service innovation

Since service innovation “relies on the expertise and co-operation of individuals from different functions” (Perks & Riihela, 2004, 184), choosing the right people with the necessary skills, competences and knowledge is shown to be necessary and beneficial to participate in service innovation projects (Alam, 2011; de Jong & Vermeulen, 2003; Johnes & Storey, 1998; Stevens & Dimitriadis, 2005). It is the challenging job of a service innovation project manager to decide about the right resources and stakeholders from inside and outside the organization. Stakeholder management entails to manage interdependencies, to embrace culture and environmental challenges as well as to balance resources, decide about timings and to communicate with stakeholders in the right way to establish or to maintain a stake they created with the respective project (Gottfridsson, 2012; Kindström et al., 2013; Payne et al., 2007; Perks et al., 2012; Perks & Riihela, 2004; Smith & Fischbacher, 2005; Stevens & Dimitriadis, 2005).

Looking at **internal stakeholders**, top managers, other units from the organization, peripheral innovators and customer contact employees are discussed as stakeholder groups for service innovation. Customer contact employees are given special attention in research since this stakeholder group is expected to share a deep understanding with the customers due to their frequent contact. It is expected that their daily customer contact leads to ideas (Alam 2006; Smith & Fischbacher 2005), but integration in the ideation phase can be reported in isolated cases only (Gustafsson et al. 1999). Training and education of such employees is stressed to make sure that customer contact employees have the ability to access and provide the organization with valuable insights on their customer needs and behavior (Brentani & Ragot, 1996; Lages & Piercy, 2012; Melton & Hartline, 2010). Nevertheless, empirical findings show that customer contact employees are not integrated as a source of ideas, but only during full launch and promotion, in service organizations (Melton & Hartline, 2010).

The commitment and constant engagement of top management as a major internal stakeholder group is considered to be vital for the success of service innovation. It is important that senior management constantly engages in SI (de Brentani & Ragot, 1996; de Jong & Vermeulen, 2003; Smith & Fischbacher, 2005). In smaller companies, the owner or manager and employees strongly contribute to service innovation (Gottfridsson 2011; Nicolajsen & Scupola 2011), especially during development and testing (Smith & Fischbacher 2005). In non-service organizations service innovation is often not a formalized process. Therefore, it belongs to the roles of top management to assign resources and give weight to service innovation throughout the service innovation process as well as to provide practical help to the project. (Ettlie & Rosenthal, 2011).

Other internal units and cross-functional teams are contributing in service innovation: especially during development, specialized skills from other departments might be needed and may help to identify and evaluate consequences of a service innovation project (Johnes & Storey, 1998; Schleimer & Shulman, 2011). In research on service innovation in manufacturing it was found that even internal stakeholder integration can be challenging: the exchange of knowledge can potentially be limited by the units of the company because of different understandings, engagement and procedures (Kowalkowski et al., 2013).

External stakeholders for service innovation discussed in literature are customers, suppliers and partners, universities, competitors and consultants (Rusanen et al., 2014). Perks and Riihela (2004) found in their case study in service organizations that external stakeholders are integrated foremost at the beginning and at the end of the service innovation process.

The role of the customer or user has been given a special emphasis in the context due to their centrality in the service logic. Throughout literature, a deep understanding of the customer needs for service innovation is stressed (Bettencourt, 2010; Payne et al., 2007) especially in the context of organizations with multiple products and units (Payne et al., 2007). Previous research has revealed a variety of benefits of customer integration: innovations involving customers are found to be more successful, customer integration has the potential to enable service innovation that answers to the customer expectations (Melton & Hartline, 2010; Sandström, Magnusson, & Kristensson, 2009), it improves the effectiveness of service innovation (Magnusson, Matthing, & Kristensson, 2003; Martin & Horne, 1993; Ngo & O’Cass, 2013), and it can increase speed to market (Carbonell, Rodriguez-Escudero, & Pujari, 2012; Fang, 2008).

One of the challenges discussed by researchers is the fact that it can be difficult to identify customers as external stakeholders that are helpful (Matthing, Kristensson, Gustafsson, & Parasuraman, 2006; Nambiisan, 2002). Research by Carbonell et al. (2012) and Matthing et al. (2006) showed that the integration of specific types of customers and users affect the outcome of service innovation differently. Whilst e.g. lead users can contribute with very novel ideas, it is the integration of close customers that increases speed to market and supports access to critical information (Carbonell et al., 2012).

Even though customer integration is found to be critical for market success, Matthing et al. (2006) find that it is insufficiently practiced. This might be because it is unclear how to integrate customers (Matthing et al., 2006) or how to extract tacit knowledge from the interaction with customers (Berger, Möslin, Piller, & Reichwald, 2005; Mention & Asikainen, 2012). In both contexts, B2B and consumer services, Nordin and Kowalkowski (2010) and Smith and Fischbacher (2005) indicate that customers might not be able or willing to articulate their needs.

Other external stakeholders for service innovation are suppliers, partner organizations, outside collaborators (such as e.g. non-users) or the public (Lee, Olson, & Trimi, 2012). The integration of external resources and knowledge might foster unique service innovations and more radical innovation (Lee et al., 2012; Ordanini & Parasuraman, 2010; Schleimer & Shulman, 2011). Still, different experiences, knowledge and cultures are adding challenging complexity to service innovation projects, as Gottfridsson (2012) reveals. Processes are required to extract value from relationships. Universities are a special type of external partner that might be integrated to e.g. access basic knowledge and to improve problem solving capabilities (Perkmann, Neely, & Walsh, 2011).

Overall, in service organizations it is a challenge for stakeholder integration that the integration of customers and other external stakeholders demands major investments for the acquisition and conversion of their knowledge (Leiponen, 2012; Mention & Asikainen, 2012). The management of external stakeholder integration is taking away resources from internal functional stakeholders (Perks & Riihela, 2004). Furthermore, the communication of the service innovation, its benefits and requirements amongst stakeholders can be difficult (Perks & Riihela, 2004).

Based on the notion that service innovation is an organization-wide challenge, the integration of all affected stakeholders is required in theory (Edvardsson et al., 2013). But still there is a lack of frameworks on how to manage the co-creation process and how the co-existence of inter- and intra-firm collaboration is happening and eventually influencing each other (Payne et al., 2007; Perks & Riihela, 2004; Schleimer & Shulman, 2011);

2.3 Modes of stakeholder integration

For all types of stakeholders, internal and external, the choice of the right level of integration was found to be a crucial factor for service innovation by Perks and Riihela (2004). The interaction of an organisation with its stakeholders varies in intensity and emphasises different roles of stakeholders as well as different activities. This has been conceptualized in a variety of concepts. Russo-Spena and Mele (2012) refer to different activities of external stakeholders with their model of “5 Co’s”. Gottfridsson (2012) proposes a perspective of three different types of actors for knowledge transfer, whereas Carbonell, Rodriguez-Escudero and Pujari (2012) introduce the terms “breadth” and “depth” for customer integration. Hereby, breadth is reflecting how often customers are integrated, depth refers to the level of the integration, superficial or deep. Another model by Edvardsson et al.'s (2010) centre the role of customers. In their customer collaboration model, the customer can take the role of a buyer, be the subject of interest, serve as a provider for information, take the role of a co-developer or be the developer. Similar is the model by Blazeovic and Lievens (2007) that distinguishes customer participation according to their active participation in the service innovation process. Customers can be active users, active informers and bi-directional creators of solutions.

In a similar vein with the latter, Alam (2002) presents four ascending levels of integration: the passive acquisition of input by the innovating organisation, information and feedback on specific issues, extensive consultation with users, and highest, representation, the user joining a development team. Building upon this framework with a stronger management perspective of customer integration, Jonas, Möslin and Roth (2013) have transferred the customer integration model to a stakeholder integration model. They adapted the model to categorize the degree of stakeholder integration in three stages, as presented in figure 1.

Presenting the model from left to right, the lowest degree of stakeholder integration is “passive integration”. In this mode, the stakeholder is being given the role as a “subject of interest”, meaning that he might be e.g. observed without even knowing, as in

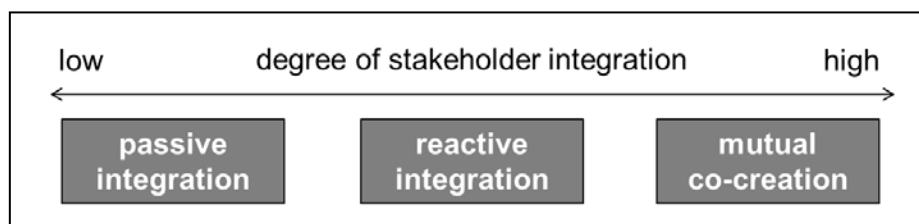


Figure 1. The degree of stakeholder integration in three stages (Jonas et al., 2013).

market analyses or test purchases. In the next degree, reactive integration, stakeholders are serving as provider for information. They are responding to a request for feedback as in questions in an interview or a survey (Jonas et al., 2013).

The third mode, mutual co-creation is characterized by an active dialogue and joint development of new offerings (Prahalad & Ramaswamy, 2004). Here, the stakeholder is integrated as an equal partner for a discussion, to solve a problem jointly. This mode is called “representation” in Alams’ (2002) concept of customer involvement and happens predominantly in settings like joint workshops.

From the perspective of service project management, a fourth mode could be that the stakeholder is taking the effort and pro-actively approaches the organisation with an idea or request. This scenario can either be managed by a provided platform and would accordingly be seen as reactive integration or mutual co-creation. If there is not such a platform, it would not be regarded as a scenario of stakeholder integration that can be actively managed.

The integration of stakeholders and its mode is expected to be of high relevance in non-core service organisations, since services cohere not only with other offered services but also with products. Service innovation in non-core service organisations often happens ad-hoc without a formal procedure, and shows complexity in information handling and communication as well as there is a strong demand for deep knowledge of customer processes and interaction with sales (Grenmyr, Löfberg, & Witell, 2010; Martin & Horne, 1993). Building upon scholarly work that investigated where and how specific internal or external stakeholders can be integrated in service innovation in service businesses (e.g. Alam, 2002; Perks, Gruber, & Edvardsson, 2012; Perks & Riihela, 2004), we seek to gain a better understanding of stakeholder integration in organisations other than service organisations. This is why this paper aims to explore a) which actors from inside and outside the organization are being integrated throughout the stages of service innovation and b) in which mode the integration is happening in non-core service organisations.

3 Methodology

To address these research issues, a qualitative explorative approach is chosen. Qualitative research in this rather new field of research allows to explore in-depth insights on real world experiences (Miles, Huberman, & Saldaña, 2013). Building upon first insights from previous in-depth single case studies of Perks et al. (2012) and Perks and Riihela (2004) in services industries and a case study on IT service innovation at a manufacturing company (Jonas & Roth, 2014), a holistic multiple case study approach is chosen to allow in-depth knowledge on a wider variety of cases. The case selection is based on the need to gather insights on stakeholder integration practices for service innovation in both, manufacturing and IT, both high knowledge intensity services (de Jong & Vermeulen, 2003). Since medium-sized and family-owned businesses constitute about two thirds of business volume in Germany (IfM Bonn, 2014), only companies from this segment were approached, resulting in four organisations with a manufacturing industry background and two in software development. The level of analysis are service responsible managers, product or innovation managers. The perspective of project managers was considered to be suitable since they decide about stakeholders to be integrated as well as the mode and timing of integration, as demonstrated by Stevens and Dimitriadis (2005). As Edvardsson et al. (2013) frame it, there is a need to understand managers since their “beliefs are put into practice” (Edvardsson et al., 2013, 26).

Table 1. Overview and background information on selected cases.

Name	Type of enterprise	Industry Background	Number of employees	Annual turnaround in €
ESC	family owned business	Manufacturing	2900	~ 400 mio.
BSN	family owned business	Manufacturing	460	~ 53000
RFS	family owned business	Manufacturing	1300	~ 140-160 mio.
EMS	family owned business	Manufacturing	1360	~ 120 mio.
LSC	cooperative society	IT, Software	6000	~ 800 mio.
OSP	family owned business	IT, Software	130	~ 10 mio.

Accordingly, the data collection for this multiple case study is foremost based on interviews with service responsible managers and completed by document-based data collection. Each case consists of two interviews, primarily product and innovation managers. Other sources such as internal presentations, student theses, sales material and other available documents were collected and used for verification and comparison during data analysis. According to Creswell (2007) and Yin (2014), making use of these different materials additionally to the main source of information, interviews, helps to verify and confirm interview propositions.

All in all, twelve interviews were conducted in the time between July 2013 and June 2014. A team of four trained researchers was involved in the conduction of interviews according to a semi-structured interview guideline. Interviews included the application of the critical incident technique to gain access to narrative and vivid examples from the near past of the interviewees’ experience with innovation activities (Grenler, 2004). Critical incidents were defined as a

typical or recent service innovation project, used to exemplify stakeholder integration in this project. This way, reflections on common routines and extraordinary behaviours could be triggered. All interviews were conducted face-to-face at the interviewees' office base and lasted about one hour in average. An overview on all interviews is provided in table 1.

All interviews were audio recorded, transcribed and categorized with help of qualitative data analysis software MaxQDA, as suggested by Miles, Huberman and Saldaña (2013). Thereby, codes were derived deductively according to analytic categories of literature in the area and inductively in line with the objectives of the explorative interviews (Coffey & Atkinson, 1996; Smith & Fischbacher, 2005). Following the guidelines by Yin (2014) and Stake (2006) each of the cases was analysed individually and summarized in individual case reports. Only after that, a comparative cross-case analysis and discussion was conducted.

Table 2. Overview on interviewees and interviews conducted for each case.

Company	Interviewee 1	Interviewee 2
1. ESC	Manager Service Engineering (MSE)	Product Manager 1+2 (PM1, PM2)
2. BSN	Sales Manager (SM)	Product Manager (PM)
3. RFS	Innovation Manager (IM)	Product Manager (PM)
4. EMS	Manager Sales & Service (MSS)	Head of Sales & Service (HSS)
5. LSC	Manager Product Management & Service (MPS)	Product Manager (PM)
6. OSP	CEO (CE)	Product Manager (PM)

Table 3 provides an overview and background information about the role of services and service innovation in the respective case company and indicates which projects were referred to as critical incidents in the conducted interviews.

Table 3. Services and service innovation – background information for the studied cases.

SC	BSN	RFS
Industry		
Engineering & Production of Electronics	Engineering & Production of Metalware	Engineering & Production of Metalware
Reported project(s)		
New solution for a customer process; new warehousing solution;	Software-based individual calculations and consulting	New coating solution for a specific customer request.
Role of service		
ESC operational services such as individualized engineering, calculations, simulations, warehousing. Supplementing services are currently in development. Services are accounted rarely and reflect only 1% of sales.	Services are consultant jobs offered for free, upon customer request. Services around the products like calculations are supporting long-term relationships with customers. Engineers in the sales team responsible for services.	Services provided are consultancy, engineering for future products sales, mostly customer pull and often for free. Training and repair as operational services on own products, providing solutions for the customer.
Role of service innovation		
The company has a referent for services driving service accountability and innovation in the respective organizational product units. A service engineering process is in use.	Rather informal and unsystematic processes guide service innovation, initiated by sales or customers. Resources for service innovation are few.	Services are being developed alongside products in the divisions. No systematic, but a step-by-step process, fulfilling the requirements of quality management.
EMS	LSC	OSP
Industry		
Production & Service in machine building	Software	Software

EMS	LSC	OSP
Reported project(s)		
Internal IT service; Customer information online platform	Customer online cockpit, software adaptations, development of consulting services.	Online sales platform for product presentation, office management software development.
Role of service		
Maintenance and repair reflect about 50% of the company's business. EMS offers even maintenance and security checks for third party machines.	Next to the development of software, infrastructure and counselling services account more than 1/3 of the organizations offerings. Still there is a product-centric culture.	Individualization and adaptations of software are the main services, consulting, helpdesk, office management consulting, legal consulting, software development.
Role of service innovation		
There is no clear service innovation process. Service development is steered by the responsible sales and services unit.	Service innovation is led by product management units and supported by a central innovation management. Innovation management initiates service projects independently, parallel. Even though there are various regular meetings, there is no clear service innovation process or guideline.	Service innovation is a top management topic, coordinated by product management and software development.

4 Findings

The empirical data identifies that for non-core service organisations internal stakeholders integrated in service innovation are top management, support functions and other units, local offices, sales and customer contact personnel such as technicians or consultants, production. The external stakeholders integrated in the examined cases are foremost customers and users. Further external stakeholders reported in this study are suppliers and external service providers, universities and competitors.

4.1 Stages and modes of integration

Concerning the mode of stakeholder integration, the case study analysis reveals that stakeholder integration is in the majority of cases happening in a reactive mode. The mode of mutual co-creation is shown for the integration of internal units, especially partner units in the very beginning of the innovation process and during development. Customers and users play an important part as a reactively integrated resource: they are integrated reactively and passively during idea screening, idea generation and idea evaluation. Further customers and users are, together with sales representatives, one of the two major stakeholders integrated for the testing of new offerings. These findings are summarized in figure 2 and will be depicted in detail in the following section.

Idea screening & idea generation	Evaluation	Development	Testing
Mutual co-creation - with members/ other units of the organisation	Reactive integration - of customers and users, informal - internal support units and experts - sales - top management	Mutual co-creation - with members/ other units of the organisation	Reactive integration - of customers and pilot customers - internal experts - sales representatives
Reactive integration - of customers and users; direct and indirect - consultants - sales and service personnel with customer contact		Reactive integration - suppliers/ service providers - internal units and support units - local units - top management	
Passive integration - of competitors; direct and indirect			

Figure 2. Aggregated modes of stakeholder integration in the different stages.

4.1.1 Stakeholder integration in idea screening and ideation

The early phase of the innovation process with the highest level of stakeholder integration: internal units and colleagues are integrated in the mode of mutual co-creation for idea screening and -generation. Majorly in workshops, internal work groups brainstorm together on behalf of input such as customer feedback, strategic guidelines and the motivation to improve business by joint ideation. Internal units are integrated foremost to align knowledge about market developments, customer input and technical know-how. Extraordinary is the example of RFS, who organise a yearly retreat for mutual co-creation across the organisational divisions, to align expertise across disciplines and units:

It's already something like a tradition to sit together in a hotel on a weekend or somewhere else, once a year, to brainstorm and throw ideas together. This was we identify new breeding grounds for innovation that gets more and more interesting by its concretization. (RFS – PM)

The majority of stakeholder integration happens in the mode of reactive integration, though. The most prominent stakeholder group for reactive and passive integration in idea screening is “customers and users”. In formal and informal processes, customers are being observed, interviewed, asked for feedback and asked for input in informal conversations. Customers were given a strong role for triggering the initiation of new services or consultancy activities at the supplying organisation: the interviewees report about active pull by the customers for the solutions of their problems, as e.g. interviewee EMS - HSS formulates it.

It's a lot from the customer. We have an enormous amount of machines in maintenance, a lot of customer contact. So our customer comes and says 'there is that service person that does these smaller motors here. That's a simpler quality test than the ones you do. Couldn't you do the service for these motors as well?' This is one of the projects that we are looking at, currently. (EMS –HSS)

Customer integration and the integration of internal sales and customer contact personnel during the stage of ideation go often hand in hand in the cases examined. Interviewee LSC – PM stresses how colleagues in service and consulting gain access to customer needs and forward them to the product managers:

Service is important since they talk to customers, on everyday basis. They see where problems and potential for improvement lies. [...] We also have consultants in the field who administer projects at the clients' location and spend several days with them. They really get a feeling for what is needed and bring that back. (LSC – PM)

The active approaching of customers to find out about needs and behaviors is prominent in the cases that deal with service innovation in IT - LSC, EMS and OSP. Regarding the cases in manufacturing, the customer integration has a stronger character of detecting and collecting customer needs when already in interaction with the customer, because of another project or sales process. These are occasions when customer contact employees ask their customers about their needs and observe their behavior.

The integration of sales and other internal units is characterized by the mode of reactive integration, being rather a provision of feedback and answers to questions than solving problems and thinking together. Reasons for integration are, above all, access to their knowledge about customers and the market. Further, project managers aim to create a stake in service innovation projects from early on or to integrate the expertise of other units for unique offerings.

To give employees at all organizational units and levels the possibility to engage in product and service innovation to all employees, in three of the case companies, RFS, EMS and LSC, all employees are engaged to provide their ideas in a pool for idea and future trend screening. This happens online at LSC, via e-mail at RFS and in a post box at EMS. All three cases have in common that they gave the impression of a strong innovation culture.

A third point in the fuzzy front-end is the passive integration of competitors or “the market”. It was reported as common practice amongst all case companies to screen and watch competitors’ offerings. This passive integration is happening by the product managers themselves and additionally by innovation management working in parallel at LSC and ESC.

4.1.2 Stakeholder integration for idea evaluation

After a concept for a service innovation project has been established, internal stakeholders, customer contact employees and, less pronounced, customers are being integrated reactively. The evaluation of innovation initiatives is foremost accomplished after receiving a first assessment, feedback and opinions from internal stakeholders that are asked for their “go” that the idea can become a project. In the majority of cases, these internal stakeholders are top management, internal units with a link to the idea, e.g. marketing and IT, and sales. This reactive integration for idea evaluation can be formal in weekly or monthly board meetings or informal.

In one case, at BSN, sales representatives are external agents. They are integrated reactively in the idea generation phase as well. *“You talk about these things with the sales agents and they say ‘this and that would be important, too’. It’s interplay between the development team and sales.”* (BSN – SM).

Either directly or through sales representatives, customers are being integrated in a reactive mode, to give feedback. This is in many cases happening in a rather informal way, building upon trusted relationships.

Parallel to informal conversations, case company LSC has an established customer board that meets twice a year and is getting informed and reactively integrated on new ideas and ongoing development projects. But even ESC reported about integrating customers in special sessions: *“We tried it for the customer online cockpit for the first time. We asked two, three larger customers to our table, separately. We presented the basic structure and asked them questions about it. It’s not the usual way, that was the first time.”* (ECS – MSS) Another scenario for reactive customer integration is presented by RFS who invites customers for an “open house day” to present latest developments and give the possibility for open exchange and feedback conversations.

4.1.3 Stakeholder integration during development

During development, internal stakeholders are the predominant stakeholder group. The project manager integrates IT resources, experts and product related units in the innovation process to define the future service in depth and to solve problems as they occur. Top management and boards as well as local units are reactively integrated to stay informed about the progress and to maintain a stake for the support of the project.

Interviewee ESC – MSE summarizes the need for the early integration of internal units as follows:

All units should be participating from the beginning, of the project, this is important. Because, if a department is not informed but needs to participate in some sort of production process... and they realize we cannot do it that way – then we are in trouble. From the beginning you need to have everyone on board who is affected by the project. (ESC – MSE)

In this stage of the service innovation process, external service providers are integrated in a reactive mode for the reason of resource gaps to fill. These might be human resources, like engineering or programming resources or required equipment in cases at hand. The suppliers for services might be engineering offices, software agencies and rarely innovation management consultants. In three cases universities and students were found to be integrated stakeholders to support the organization with specific equipment, tools and know-how or time.

4.1.4 Stakeholder integration for the testing of services

For the testing of new services, stakeholder integration is enabled in a reactive way throughout all observed cases and projects. It can be derived from the data that internal experts and sales representatives are the first to be integrated for feedback and adjustments of the offering as well as for strategic reasons.

The software development cases made strong use of pilot customers, implementing several formal and informal feedback loops, using surveys, usability tests on one hand and direct conversations on the other hand. Unlike the manufacturing cases who offer a service as a rather individual service in the beginning and maintain feedback from the direct interaction and presence at the customer.

Even though the impact is much stronger in IT related cases, test run with customers are not restricted to IT development projects: RFS’s innovation manager reported about a test run with internal pilot users for an internal service, for two years. At the cases for software development, reactive customer integration in testing can be conducted by product management but also by the IT developers in parallel.

4.2 Further insights from the exploratory study

Benefiting from the exploratory set-up of this multiple case study, further insights about stakeholder integration could be derived. It is found that (1) managing and balancing internal and external stakeholders is the task of the product manager, next to the product management job. For internal stakeholder management informal stakeholder integration (2) and the continuous integration of top management (3) was found. For external stakeholders the practice of indirect integration (4) was identified. Last but not least it was revealed that organisations are getting integrated by their customers at the same time as they are operating as stakeholder integrators (5).

(1) Data revealed that in five of the six researched case companies, **service innovation is managed by product management**, next to their regular duties. Only at EMS there is a team called Sales, Service and Maintenance that is in charge of service innovation. Accordingly, product managers report that their service innovation projects are standing in competition for resources in the everyday business. Even in the cases where there is an innovation management responsible to support service innovation activities, **managing and balancing internal and external stakeholders** is the task of the product manager.

(2) Next to formal and project management processes, there are a number of **informal and parallel processes** observed, **for the integration of internal stakeholders** like top management, but also customer contact employees, other units or rarely customers. This can be a question for feedback about ongoing testing activities, sensing of support for ideas with the top management during lunch or informal incidental meetings with customer contact employees.

(3) Summarizing over all cases and the **integration of internal stakeholders in all stages**, the empirical data shows that there are regular milestones meetings, where project managers report their service innovation project progress to a board of other units and /or **top management**, even in those cases where there is no articulated service innovation process or strategy. The character of integration of top management and internal units here is foremost reactive but can develop into discussion and problem solving meetings that develop to the degree of mutual co-creation, intended or not.

(4) For the integration of external stakeholders, a phenomenon emerging from the data analysis is that the **integration of customers** in the very beginning and in the very end of the innovation process is **indirect**, majorly implemented by sales personnel. In the studied case companies, project managers generate knowledge and triggers for service innovation from the results of the contact between sales and service personnel and the customers.

We first diagnose what does the market need, what input do we get from our local offices, from our employees or even directly from the customer. That is, we do not have the direct contact here in our headquarter. Most of the times it runs via our sales employees out there. From that we derive our requirements for innovation, prioritize them and develop our two to three big projects per year. (EMS – MSS)

In a majority of cases it was also found that the integration of customers for testing new services is not turned into action by the project manager but by a third party. In the example of ESC and BSN testing is realized through sales representatives. *“We had our first inspection and approval from the technician. Then we, no, our service responsables, asked our best customers to participate in a three month trial.”* (ESC – MSE) Even at LSC and OSP the testing with customers is carried out by software developers, who forward their feedback to the service innovation project manager.

(5) Finally, the analysis of the present empirical data showed that manufacturers like RFS, ESC and BSN and also the software developer OSP **are getting integrated by their customers**. The more know-how is demanded, the more co-creative and trustful is the mode of collaboration. This can trigger innovation projects or ad-hoc development of a new service for an individual customer demand.

The majority, 80-90%, of what we developed and even our current innovation topics are based on suggestions or wishes from the customer. What the customer says decides – we develop it this way and maybe a tick more to that. This is why our development is so strongly linked to the teams that deal with customers every day, who know about their needs and pains. (OSP – CE)

5 Discussion

This study was designed to give better insight into the practice of stakeholder integration non-core service organisations. With an exploratory research approach, the authors aimed to illuminate which stakeholders are getting integrated in which mode in the different stages of the service innovation process, and why. The study showed that “mutual co-creation”, the highest degree of stakeholder integration, is realized with the members of the organisation only, with an emphasis on the early phase of service innovation. Employees are seen as one of the key sources for idea generation and are integrated throughout the innovation process because of their knowledge about processes and customer needs, because of their expertise and technical know-how and also to maintain a stake in the project (strategic and political considerations).

This study shows that the idea generation with internal stakeholders is strongly dependent on the integration of customer contact employees as the major source for information about customer needs, problems and behaviours. Still, customer contact employees, just like customers themselves, are integrated in a reactive mode, with few exceptions. Scholars like Edvardsson et al. (2013), Matthing et al. (2006) and Gustafsson et al. (2012) have discussed that reactive stakeholder integration might only skin the surface of customer needs in the context of service organisations. The access

to sticky knowledge and latent needs is a central topic in service research and SDL (Edvardsson et al., 2013; Gustafsson, Kristensson, & Witell, 2012) which can presumably only be accessed in bidirectional communication processes (Gustafsson et al., 2012) and is difficult to process and translate into the organisation (Mention & Asikainen, 2012). In the present context of non-core service organisations, it is only trusted customers that are integrated, with the omnipresent notion of relationship development with the customer for the future of business.

This empirical study also revealed that customer integration in practice is not implemented by the decision making service innovation project manager but by customer contact employees that forward information. This confirms findings from a case study in service industries by Smith and Fischbacher (2005) that gave first evidence that the needs and interests of stakeholders are channelled through other stakeholders. Given these practices, this paper identifies that customer contact employees should be consciously given the role of “translators of information” (Gottfridsson, 2012) and be integrated intensively to “make the voice of the customer heard” in the organisation (Smith & Fischbacher, 2005, 1042). The in-depth knowledge of customer processes, necessary for service innovation in non-core service context of manufacturing, and high levels of detail with an immersion in the context of customers are found to be beneficial factors for service innovation in service organisations (Gustafsson et al., 2012; Melton & Hartline, 2010) and should be considered as a motivation for direct, yet more resource intensive, customer integration.

The management of internal and external stakeholders for service innovation is, especially in the manufacturing cases ESC, BSN and EMS a task that comes next to the project managers’ core business. This indicates that the integration of external stakeholders is competing for resources with the integration and management of internal stakeholders as research by Perks and Riihela (2004) has shown also for service organisations. The findings of this study contribute to current research that in non-core service organisations, the service innovation project itself is additionally conflicting with every day product business.

6 Conclusions

From the perspective that service innovation is a multi-dimensional process, depending on and effecting internal and external stakeholders bi-directionally (Schleimer & Shulman, 2001), it is crucial for the management of service innovation projects to know about the roles, modes and timing of stakeholder integration.

This empirical study in business-to-business services in manufacturing and software development shows that stakeholder integration is rarely implemented in the mode of mutual co-creation. From a SDL viewpoint, the co-development of future value propositions, especially with customers, is a key issue. Mutual co-creation could be identified with internal stakeholders for idea generation, only.

This study shows that trusted customers are integrated reactively in the very early and the late stages of service innovation. The fact that this integration is, in frequent cases, realized as indirect integration through customer contact employees leads to the question if this practice can really provide decision making project managers with deep insights on customer needs and behaviour. As Matthing et al. (2006) state, this might only “skim the surface” of potential insights – but in non-core service innovations, long-term customer relationships are omnipresent and affecting the integration of customers.

The study illustrates that top management and other internal units are integrated reactively throughout the service innovation process, to create a stake and to include “affected stakeholders” (Edvardsson et al., 2013) early. Here, future research could analyse the bidirectional effects in service systems on more detail and depth.

The interdependency of stakeholder integration is highlighted in this paper. The formal and informal integration of stakeholders can affect other stakeholders, the resource allocation in different projects of the organisation as well as the future relationship with the stakeholder. More research is needed to deepen our understanding of these interdependencies. It would be interesting to learn more about the effects that changes in service innovation strategy or the tools to be used for stakeholder integration have on the organisational context, processes and outcome of service innovation activities.

Finally, this explorative research gave evidence that stakeholder integration and being integrated as a stakeholder can be happening simultaneously. Future work could examine this further and make the interplay between different service systems more explicit in models and definitions.

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Social investments: A social innovation approach and the importance of active ownership

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This paper is about social investment funds as a tool for directing financial means for welfare services supplied by local authorities. The empirical context is a municipality in Sweden. Through the fund social welfare agencies can get investment loans through which innovations in welfare services may be developed and integrated into the organizational practices. The aim of the paper is to contribute with an understanding of significant organizational conditions for the development of multiplier effect of social investment in a municipal context. The result highlights the importance of (1) a project manager with a focus on method development, (2) learning and transformation of method development into multiplier effects, and (3) management that direct attention toward the creation of multiplier effects.

1 Introduction – Social investments and the goal to create multiplier effects

The basic purpose of public organizations in Sweden is realization of societal interests via decisions in democratic assemblies. The implication is that activities of public organizations often have several different overall mission and goals (Lind; Ivarsson-Westberg, 2011). The Swedish municipalities of today have four main assignments: democracy, supplier of service, authority and being a society actor (Montin, 1997; Jonsson et al.,2002).

Infrastructure investments, business establishments and employment issues, as well as tourism and the establishment of training programs, housing for the elderly and mentally ill have become important parts of being a society actor. Particularly in the light of structural problems and setbacks related to the traditional financial governance (Jonsson, 2013). But the achievements of municipalities do not only have concrete effects, it also has more implicit consequences as it influence attitudes in society. This is something that happens both consciously and unconsciously (Jonsson et al.,2002). One important tool in this is the use of social investments and more particularly the establishment of social investment funds.

A social investment fund gives monetary resources to projects to enable them to invent new and more efficient practices and organizations for welfare services. These can in turn be institutionalized in the regular operations without increasing costs. In the paper, the terms method development and social innovation are in a sense used synonymous for that kind of progress. The argument is that both method development and social innovations in a social investment context aims at creating multiplier effects, i.e. effects that are formed and developed, value added and leveraged from a specific project to continuous operation. Whether it is merely refinements of existing methods - method development - or development of a new method or knowledge - social innovation - the organization need an ability to convert these to multiplier effects. Hence, it does not happen automatically. It requires a well thought out organization and management for this to be possible (Jonsson et al.,2014).

Method development, social innovation and multiplier effects are things that earlier have been of subordinate importance in the municipal context (Larsson, 2008). But with the introduction of social investment funds as a new resource allocation system this has started to change. To handle this, as well as the method development, an ability to “walk on two legs” is required. First, the individuals in the project need to have the ability to act action-oriented and secondly, they must have an ability to reflect. The latter is a prerequisite to problematize and consequently developing new methods and social innovations (Larsson, 2008).

For method development and social innovation to be translated into regular operations it requires that individuals learn something. However, it is not enough that individuals learn something theoretically; it also requires that individuals are able to apply the lessons learned and to allow them to it (Ellström, 2009). An individualized learning in development contexts is no guarantee of long-term effects. To convert method development to multiplier effects it requires individual learning in theory and practice, but it also requires an organizational learning (Burlin; Svensson, 2011).

We are well aware that the concept of social innovation sprawl, but in recent years there has been studies to homogenize the use of social innovations. The basis of what we today call social innovations is based on Joseph Schumpeter’s research. He broadened the concept of innovation to not only include technology development (Rönning et al.,2013). Cajasanta (2013) has through literature studies from two previously dominant perspective, actor and structure, developed a conceptualization with focus on social investment as a process. Bonificacio (2013) also clarifies the concept of social innovation by arguing that it includes an organizational process. In this paper, we take note of the Cajasanta claims – that it is important that we continue to study social innovation from a process perspective. Social change takes time and consists of social processes is important.

Research has also shown that we know little regarding the creation of method development and social innovations that lead to multiplier effects. According to Cajasanta (2013) and Rönning et al.,(2013), we need to increase

understanding of social innovation from a procedural point of view. What we know is mainly related to the large EU project (Svensson et al., 2013). We know far less about this in relation to social investment funds in a municipal context – for obvious reasons because it is a new resource allocation system.

Finally, it needs to be highlighted that capability of handling both action and reflection is a key success factor in carrying out development work in project form (Löfström, 2010a, 2010b). But that does not seem to be enough to create multiplier effects. Brulin and Svensson (2011, 25) argues that the development-oriented learning that takes place in the form of projects need to be regarded in an organizational context with an emphasis on active ownership. With active ownership they mean “that there are strong players who can create the conditions for a project driven forward and taking responsibility for the results taken care of and will be a long lasting impact”. The active ownership is a complex phenomenon in a municipal context because it is based on different logics (Jonsson; Arnell, 2006; Jonsson, 2008) and domains (Adolfsson; Solli, 2009). Hence, this paper argues that we need better understanding of the interplay between social investment and the active owners in a municipal context. The paper aims to contribute with an understanding of such significant organizational conditions for the development of multiplier effects of social investment in a municipal context.

The rest of the paper is organized as follows. The next section presents the what and why of social investment funds in a Swedish local government context. After that the methodological approach is highlighted. The fourth section contains a theoretical presentation on project management, learning evaluation, and active ownership. In the fifth section the empirical data is presented, focusing on a particular investment fund and one of its projects. In the sixth and final section the paper concludes with reflections regarding significant organizational conditions for the development of multiplier effects on social investment in a municipal context.

2 The what and why of social investment funds

As indicated, social investments is about using early interventions, often organised as projects, to decrease the risk of people ending up in an unwanted situation, e.g. dropping out of school, ending up unemployed, committing criminal acts, using drugs etcetera. It is mainly about developing a more efficient service that in turn creates opportunities for individuals to improve their lives, e.g. through increased school attendance, self-esteem, enhanced CV or improved family situation. In Sweden, the municipality of Norrköping started its own fund for social investments in 2010. The purpose of it is described as follows (Norrköping, 2014):

The purpose of the fund is to find preventive practices in Norrköping that break negative events at an early stage. The starting point is thus to find the local residents who are more at risk of being socially excluded and give them the right help to avoid falling off.

For the municipality, the financial benefits might involve reduced need for resources, such fewer placements of children and young people, reduced inputs from the overall student health or fewer investigations of the school psychologist.

For the individual the benefits are about a future with education, a job an own income. Simply, a better life.

When the effects of these investments are beginning to appear, when the municipal costs are reduced as a result of the investment, the units' financial space shall be reduced by the same amount. The surplus should then be highlighted in the annual accounts and earmarked to be used for future social investments. Because of that, the fund will be continuously replenished and new social investments can be made.

Both the financial and social benefits should be assessed for all investments. When an investment generates financial and social benefits, it might be time to implement the developed method in ordinary activities.

The assumption is that social investments, i.e. early interventions, are more financially advantageous than trying to “save” people at a later stage (Nilsson; Wadeskog, 2008). Hence, social investments are important from a social and financial perspective, as well as for the municipality and the nation as a whole (SKL, 2014). With that said, it is also important to note that funding for social investments is still a very small part of the total investments in a municipality; investments in fixed assets dominates.

From the beginning of the 2010's, we can see that there are a number of municipalities in Sweden that have or want to implement some kind of social investment fund. One reason is that it gives an opportunity to increase the ability to handle welfare resources both within and between time periods. Hence, this new resource allocation system helps municipalities to act as a more conscious community stakeholder and to provide more efficient service through method development and multiplier effects.

So how does a social investment fund work from a financial perspective? The Swedish municipalities are used to allocate financial resources to plan and administer annual recurring activities, and monitor and report what has been done (Knutson et al., 2006; Brorström et al., 2014). Municipalities in Sweden have been inspired by the traditional investment budgets when trying to streamline the management of welfare resources both within and between time periods. The social investment fund could be seen as an answer to the continuous cuts in budgets for welfare services while the demand increases.

As mentioned, a social investment fund provides financial resources to projects. In some municipalities this is done via a loan. Hence, the project is required to generate a return so they can pay it back. An example of this is provided above (the quotation from Norrköping). In other cases the project is given a donation without any restriction of repayment. This in turn means that the financial resources in the fund decreases with time, which is not the idea in the loan-based fund.

The municipalities that were first with resource allocation based on social investments met opposition. The arguments against social investments is that it is not possible to take up a welfare investment in an asset register, which is quite possible in areas such as school buildings, streets and bridges. There is a material uncertainty regarding the asset's value, which is one of several reasons for social investments not yet being included in the balance sheet in Swedish municipalities. It is, however, important to note that although there is uncertainty associated with social investment, the traditional budget process also contains uncertainty. Primarily they tend to focus too much on the next time period, which provides obstacles and uncertainty regarding long-term consequences.

Traditional budgeting combined with social investment means that the focus moves from being just about the costs of operations for a period, to also include discussions regarding the consequences. Also, social investments put method development and learning in forefront. Bengtsson (2013) argue that a key motivation behind the state and local government involvement in activities and investments is a pursuit of financial efficiency. Swedish municipal budgets and annual reports reveal that this is not always the case. In operating budgets, as well as investment budgets, there are municipal financial calculations that provided the principal base for the financial action plans. An explanation for this is that the municipality is regarded as an organization focused on results and balance sheet. A municipal calculation tells you what the social investment is expected to result in relation to the municipality's financial statements. A socio-economic calculation on the other hand provides answers to what the social investment will mean financially in the short and long term for the society (Eklund, 2012). The latter ones is, however, not that common.

3 Methodology

The theoretical approach in the paper combines theories from institutional organization, project research and evaluation studies with focus on learning evaluation. The literature review has contributed to the conceptual and theoretical framework needed for the analysis in our study. However, the study is based on an abductive process (Alvesson; Sköldbberg, 2008) and the collection of the empirical data has therefore had substantial influence on the theoretical framework (and the other way around).

Empirically we have chosen the social investment fund of Norrköping, i.e. the first social investment fund in a Swedish municipality. The reason is based on the approach to study social investments from a process perspective. That requires a fund that has been running for as long as possible, making the social investment fund in Norrköping the obvious choice. At the mid of 2014, six projects had received financial resources. We chose to focus on one of these, and more specifically the only one that had reached the point where money were about to be transferred back to the fund. The project is called "Every child should be in school". Hence, the study's contribution is primarily applicable in the context of municipal context, but the reader should be able to see a larger and more general use than that.

A mix of sources has been used to collect the empirical data. One is publically available documents regarding the social investment fund as a whole as well as the particular project in focus. Primary data have been derived through (1) taking part in local conferences and group discussions among politicians, civil servants and professionals in the different sectors of welfare services, and (2) via interviews with people working with the social investment fund as well as people within the project.

In a summation of the epistemological beliefs and methodological approach it becomes clear that the study contributes to the understanding of important organizational conditions for the development of multiplier effects on social investment in a municipal context. Worth mentioning is also that the study is part of a larger study funded by the Swedish Association of Local Authorities and Regions. It focuses on organization and management of social investment funds in a municipal context.

4 A theoretical approach – The project management and the importance of active ownership

The lack of active ownership related to development work, often in the form of projects, is a common explanation for why development work does not lead to sustainable efficiency. Previous research has shown that there is a lack of management work related to long-term actions. Management teams have acted as reference groups that have been focused on short-term results and an overall focus on here and now. Henceforth, Brulin and Svensson (2011) sought active owner who demands and at the same time try to decrease the vertical uncertainty between owners, management team and projects. Carlström (2005) uses the concept of collaborative ability to pay attention to the attitude demanded by the collaboration. Collaborative capacity is an ability to listen to the views of others while there is an ability to convey messages based on different logics and perspectives to interact in a fruitful way.

According to Svensson et al (2013) it is important that the management team act professionally towards the projects management and teams, with a focus on a close dialogue and learning. If the interaction between the political leadership

and the management of social investment is based on a quest for results, methodology and multiplier effects there are good conditions for learning in the projects and in the organization (Jonsson et al., 2014).

The active ownership means that, both during and after the project time, taking interest in the results and the learning that is generated in the projects. Besides that the active ownership is about taking responsibility for learning, methodological developments and creating of multiplier effects (Ellström, 2009).

How the management of a social investment fund is designed is a matter for each individual municipality. Regardless, it is important that the management team has the opportunity to disseminate information between investment projects and to the organization. It is important that the management team in the form of active owners creates opportunities to, when necessary, define the projects and link projects with base organization. Löfström (2010a, 2010b) uses the concept of boundaries, both structural and conceptual to deepen reflection about creation and termination of projects. Dealing with limits and uncertainties associated with development projects is important for the management team, but also for the project and the political leadership.

To know if the development is on track, the expected results are achieved and to continuously have a focus on learning, Svensson et al (2013) recommends a process-based learning evaluation. By including a learning evaluator early in the process, the focus can be set on how to measure the results and effects. A learning evaluator contributes to methodological development and helps to focus on how development can be translated into regular operations (Brulin; Svensson, 2011).

Through the literature review, a number of important organizational conditions for the development of multiplier effects in relation to social investment in a municipal context have been identified. The various organizational conditions that the literature has shown are important to facilitate the development of multiplier effects in a municipal context. A good project team with a collaborative ability and a good project manager is the basis for method development to take place. For it to be formed and increased, value added and leveraged it is also required that the project team is interested in spreading lessons, a learning evaluation and active ownership.

Learning evaluation in social investments is a prerequisite for monitoring the results, facilitate method development and contribute to the understanding of how multiplier effects can be created. To facilitate the work of the learning evaluation, it is advantageous that there is a forward elaborate evaluation plan. The plan is the basis, but because it is about development flexibility is important, which means that learning is the focus. To manage the complexity inherent in municipalities it is important that the active ownership reduces vertical uncertainty and thus makes it easier for project manager to highlight methodological development.

5 Empirical results - the project team and the owner of the project are responsible for creating multiplier effects

In this section we focus on the social investment fund in the municipality of Norrköping, and more specifically the project "Every child should be in school". We start of by describing the context in which the fund was established. The project is then describe based on the summation of the previous section, i.e. in turn it will cover the social investment project, the learning evaluation and the active ownership.

Norrköping was seen in the early 2010's as a vibrant cultural centre, including a symphony orchestra, a regional theatre, unique petroglyphs and a football team playing in the top Swedish league. The proximity of the archipelago and that Kolmården Zoo is located within the municipality of Norrköping was something that was emphasized. On the website (www.norrkoping.se) the municipality was presented as a supplier of services, an authority and as a society actor that supports work, business, culture and sport.

Norrköping has undergone great trials. Most prominent during the 1900s, industry restructuring as the textile industry in central Norrköping was driven out. The old industrial properties, which are centrally located along the River, constituted a unique cultural heritage. Today several of the old industrial buildings are used by Linköping University and local companies. The structural change meant that Norrköping no longer only was regarded as an industrial city. Norrköping was instead described as a city with many small companies within many different fields. In the end of 2013 Norrköping was the seventh largest city in Sweden with its more than 130 000 inhabitants. The structural transformation has meant that the municipality has more structural underlying problems compared with other major municipalities in Sweden.

Norrköping was a few years into the 2010's, organized based on assignments. This way of organizing the municipality's management had been in use for about 10 years when the social investment fund became a reality. The underlying idea of the organizational model was to provide an equivalent service in the entire municipality – based on assignments. During the 1990s and a few years into the 2000s, Norrköping was instead organized in smaller parts based on geography.

At the beginning of 2011, Norrköping began to work with the social investment fund. At the start the fund had a total of SEK 40 million available. In the mid of 2014, about 80% of that amount was actively used in the six projects. One project was reaching its end and repayment to the fund from the responsible authorities has begun to take place. As described earlier in the paper, the social investment fund is based on a reversal model - when the budgeted results have been achieved, there is a repayment to the fund. If a situation arises where social investment project does not achieve the goals and a refund cannot be done, there is a direct write down of the social investment. If that happens, the city

council have to decide whether the fund will be reduced by that amount, or if financial means will be added to the fund to keep it at a 40 million level.

It is the council who is ultimately responsible for the social investment fund, but the management of the social investment fund have the operational ownership. It is the management team who accepts proposals for investment and follows the various projects in relation to effects. Since 2014 they also focus on methods development in relation to multiplier effects.

5.1 The social investment project – Every child should be in school

The social investment project “Every child should be in school” is a collaborative project between two of the organizational units within the municipality: the Education office and the Social services. The target group is the children in the municipal elementary schools. However, children in schools that perform teaching on behalf of the municipality, a minority, are not included. In the mid of 2014 the project was in its final phase.

The objectives of the project were split into three levels: individual, group (school) and organization (municipality). At the individual level, the goal was mainly through increased self-esteem reduce exclusion. Absenteeism at the end of the project was expected to be zero. At the group level, the goal was to increase the knowledge of school absences and successful practices and methods to reduce school absenteeism. At the organizational level, the goal was to find ways for better synergy realisation between organizational units.

At the start of autumn 2012, the project was structured on the basis of five teams. The teams were directed to different geographical areas in the municipality. Each team had its own manager and the teams consisted of social workers and educators. After more than half a year the problems with the teams working in different ways were highlighted. Particularly there was no one with a holistic view of the project that could coordinate the work. In light of this setback, it was decided to appoint a project manager working half-time. After the project manager was in place, another important change was made. Instead of working towards geographical areas the team were organized from different missions (remember – the municipality as a whole was organized around assignments). The teams’ various missions became outreach- and attendance promotion, support for early intervention and treatment provision. This generated a more focused use of the resources.

5.2 Learning evaluation – Discoveries during the project

When the project started, it contained guidelines regarding follow-up. They were mainly focused on the objectives with the use of questionnaires as the main method for gathering data. Besides that, medical records and registration of school attendance was used. The latter was documented via an IT support system named Dexter. This was a completely new system, and therefore there was uncertainty among the schools on how the system should be handled. The project has therefore put a lot of effort on increasing the use of it. A high level of use means better data to analyse patterns in absenteeism; a prerequisite to be able to find all students that needs support. Data from the project shows that the registration in Dexter is increasing and all schools are expected to use it fully at the end of 2014.

As the project progressed the project manager and the management team of the social investment fund acclaimed a need for an ongoing learning evaluation of the project. It was thought that such an evaluation would give better insights about the consequences of the processes within the project. Two experts from the two participating office’s (the Education office and the Social services) was asked to follow the project in more detail and present progress reports for the fund’s management team. The interim reports were official and was also presented at the municipality’s website. The follow-up in relation to the objectives show that the project is successful. Attendance has improved during the project and the invalid absenteeism has decreased. Despite this, it is interesting to note that the first reports highlighted performance monitoring, but with time the evaluations got more focused on how the method development would be put into the regular organization after the project ends.

There are several examples of the work to create a transition from project the regular organisation. Most of them have its base in concrete routines for the schools to work by to be able to handle the problems on their own. Hence, the creation of routines is a way for the project to facilitate the creation of multiplier effects. Since this facilitation has been considered important it has consumed a considerable amount of the resources in the project. For example, one person has had these routines as the main task since the internal reorganization of the project, and a lot of meetings and discussions around these have been conducted.

One concrete routine that has been highlighted is the need for an appointed person in every school responsible for the children’s attendance. A lot of schools have already chosen to follow this recommendation. Project members have also conducted meetings with these to inform them on their ongoing work as well as the routines that they have establish based on the experience from the project. The later consist, among other things, of routines for establishment of (1) a plan to deal with the absence of a specific child, (2) three part conversations between the child, parents and Social services, and (3) a better collaboration and information exchange between the school and Social services.

Another example of the work to ease the creation of multiplier effects is the full-day conference that was arrange in the spring of 2014. It had the theme “All children in school” and focused the learning that has come out of the project. The project has had an experimental approach since an established method was lacking. During the conference the

conclusions from the project was therefore discussed. Several of them were in the form of concrete recommendation (with related tools) to the schools.

As mentioned, the learning evaluation has contributed to the focus on the transition from project to the schools. But the evaluations have also shown that the one important lesson on the group level (schools) is that there are many causes of absenteeism, and that they in turn often are complex. The project teams' conclusion from this was that each child's situation must be explored and that it is important with a large amount of flexibility in the daily operation, i.e. the activities must be adapted so that they fit the individual child. Another lesson is the importance of asking for the child's experiences; they give a lot of useful information that can be used to tailor the support. For this knowledge to be used as a base for action in the schools after the project, i.e. to implement the methodology development, the project management highlighted that there needs to be staff in the schools that understand and use the developed processes to manage school attendance and absenteeism. Giving a person at each school the responsibility of overlooking the attendance of the children is one important part in this, but other roles are important as well.

5.3 The active ownership – Continuous feedback and focus on results

In Norrköping, the management team of the social investment fund consist of the managing director of each office as well as two officials who work with the social investment fund. The management team also includes a few appointed politicians. This is considered important for the continuous dialogue between the politicians and the officials. The management team is chaired by the municipal financial manager. One important reason for this is to signal the importance of the fund. Another is the fact that he was the one that developed the model on which the fund is based. The model's structure is similar to how municipalities in Sweden manage investments in fixed assets. In the latter case an investment is made and when it is in place the concerned part is charged with a capital cost (interest and depreciation). Social investments works in the same way but with an important difference: social investments are not charged with any internal interest.

When the social investment fund had just been created, the management team followed the projects with a focused on performance monitoring; are they reaching the objectives? With time they noted that this was not enough; they felt that they needed more information on the progress, especially when one of the projects reached its finalization. Among other things they needed information on the transition between project and ordinary operation, i.e. how the projects are preparing for multiplier effects. The need for a continuous learning evaluation for every project grew stronger, and the usage of it right from the start in new projects. This was sought to create the attention of the projects towards results, methodology development and conditions for multiplier effects.

In relation to the project "Every child should be in school", the implementation of a learning evaluation came as a result of a dialogue both between and internally in the management team for the fund and project respectively. The management of the fund, both officials and politicians, have also shown an active interest in the project's continuous results. The manager of the Education office and the Social services respectively (the two involved offices in the project) have come to take a particularly active role in this; requesting information from the project, being there as active support and showing that they care about the results. With a learning evaluation as the base this has meant a focus on the development of method and structures that can be used after the project. One concrete consequence of this is the full-day conference mentioned in the previous section. The conference was not an event organized by the project; it was set up as a collaboration between the project and the management team. This shows that the management team finds the project important and want to create the best opportunities possible for multiplier effects.

6 Conclusions – Multiplier effects and the importance of an active ownership

As mentioned earlier, several Swedish municipalities have drawn inspiration from traditional investment budgets to increase the ability to handle welfare resources both within and between time periods. This has created a new resource allocation system; the social investment fund. The idea is that the fund should lead to methodology development and social innovation, but the fund per se could also be considered a social innovation. That innovation is an important organizational tool when searching for method development and multiplier effects. But a social investment fund in itself is no guarantee for success; a well thought out organization and management is necessary for that to happen (Jonsson et al., 2014).

Given that a social investment fund is a new resource allocation system for the Swedish municipalities, there is reason to research its construction and how it is used. Therefor the aim of this papers aim is to contribute with an understanding of significant organizational conditions for the development of multiplier effect of social investment in a municipal context.

The organizational conditions that have been put forward in earlier research, as well as in our study, are important to understand and to handle. These conditions are summarized below.

- Social investment project: it is important with a project manager with a clear focus on method development.
- Learning evaluation: transformation of method development to multiplier effects is a necessity for long-term success, and learning is in important enabler in that.
- Active ownership: the management needs to manage the process and direct attention toward the creation of multiplier effects.

A good project team included a collaborative ability, and a good project manager constitutes an important base for method development to take place within the framework of social investments. For method development to be formed and developed, value added and leveraged it is also required that the project team is interested in spreading lessons, are using a learning evaluation and have an active ownership.

Previous studies (Ellström, 2009) and the reported results in this paper have shown that a project that can handle action and reflection is an important organizational condition for the development of new or improved methods. Carlström (2005) has shown that collaborative capacity of participants in projects is important. The case of "Every child should be in school" shows that via (1) the large amount of internal discussions that have taken place within the project, and (2) the dialogues between the project and representatives from the schools. But for method development to have lasting impact it requires more than that.

Learning evaluation is an important approach if development is to be realized in the organization. The learning evaluation is focused on results and how the method development can be converted to multiplier effects (see also Svensson et al., 2013). The paper, and specifically the case, draws attention to the importance of organizing for learning evaluation in the planning phase of a social investment project. This was not done in the case project – but the actors learned the "hard way" that this is important.

The single most important organizational condition, however, is the active ownership. Previous research by Brulin and Svensson (2011) shows that we know little about the active ownership. And we know even less related to the municipality context and social investment. The paper has shown that the active ownership in a municipal context is complex. It involves different ideologies (Arnell; Jonsson, 2006; Jonsson, 2008) and different domains (Adolfsson; Solli, 2009). Also, the active ownership consists of several players - players who over time are replaced and act upon different logics. Regardless of the underlying complexity of the active ownership in a municipal context, it is the active owners which have the greatest impact on the process to multiplier effects. The other conditions are important, but the active owners are those in charge of the process. They have the possibility to create good prerequisites for the other conditions and actors that are involved. In the particular case this is done via an active support, showing that good results as well as concrete work to convert the developed method to the ordinary organization are important. The support communicates that the work is material. Without that it does not matter if a fantastic work is being done within the project; if the politicians and top managers do not care, changes in the ordinary organisations will never happen.

Even if the paper has drawn attention to important conditions for creating multiplier effects, especially active ownership, we need to know more about the active ownership in a municipality context and particularly in relation to social investments. We need longitudinal studies of social investments, active ownership and multiplier effects.

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A new approach for building the optimal free-to-play game offering

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This study examines mobile gaming industry and in specific what is the optimal free-to-play game design. We utilize business model and customer oriented service design literature and introduce a novel method, Design of Experiment (DOE). We conducted two workshops with gaming experts and interviewed mobile game developers to identify the optimal free-to-play game design. As a result we present a framework for optimal game design, evaluated by the gaming experts. With this research we are contributing to both service design theory and introducing a novel customer oriented methodology.

1 Introduction

Since the launch of smart phones and tablets, the way we see games and playing has changed dramatically. Mobile games and the revenues they bring have created a lot of opportunities for companies. Inside mobile game industry the focus is shifting from the so called premium games (purchase and play) to free-to-play games.

The problem with today's service management in general and also in gaming industry is that service offerings do not meet the customer's requirements and therefore lead to their low usage and lower willingness to pay for them. In order to produce service offerings that customer will use, a systematic customer-oriented service design process needs to be established. (Aurich et al., 2010, 138) The problem with the shift in gaming industry is the optimal structure of the game design to be able to attract the customers not only to download the game but also to purchase the game items.

In this study, we utilize a novel technique, Design of Experiment (DOE) (Montgomery, 2012) to structure the game offering in the optimal way to meet the customer requirements. Ideally designed service design would provide most customer value and thus result in business success for companies operating in the game industry (Howden; Pressey, 2008; Hu et al., 2009). Since the focus is shifting from premium games to F2P games there is clearly a need to study how free-to-play offering and customer requirements meet and how the offering should be modified. Therefore the research question of this paper is: *What is the optimal service design of free-to-play service model?*

After the introduction we present the theories used in this study. Second, we present the methods used in this study and illustrate the results of our study. After results, we move to discussions and conclusions.

2 Literature review

2.1 Business models

Business models emphasize a holistic, system-level approach in explaining how companies "do business" (Zott et al., 2011, 1019). Business models are trying to explain in a simplified manner the mechanisms which companies utilize to create value. The main three components of a business model are: 1) value proposition, 2) architecture of value creation and 3) benefit model. Value proposition defines the benefits customer or another partner of the company will achieve. Architecture of value creation defines the benefits achieved by the company. The necessary internal and external units and different transformation processes are described. Benefit model describes the mix of benefit sources and kinds of benefit. (Aurich et al., 2010, 140)

When focusing on technology and innovation management, the main purpose of a company's business model is to understand how technology is converted into market outcomes. In order to influence the market outcomes, companies need to focus on finding technology's connection with customers and understanding different players and their roles in the operating network. When business model is the correct one it will facilitate value creation with the technology, dynamics in innovation network and creating an infrastructure of relationships. (Zott et al., 2011, 1036)

2.1.1 Business models in mobile gaming

Mobile game developers can be seen as companies which are utilizing a certain technology or innovation in creating new products and services. In mobile gaming industry, four different business models are present at the moment: premium, freemium, ad supported and hybrid. Their characteristics are discussed next.

Premium game is defined as a game that costs more than \$0.99. It has been the predominant model in the early phases of application stores and is used by some of the biggest names in the market, such as Cut the Rope and Angry Birds. When thinking what games should be offered as premium games, the rule of thumb is that if there is no natural or obvious way to integrate consumable items to the game or app, the right business model would be premium. (Morel, 2012) Once a premium game is launched to the market the content of the game cannot be changed. Thorough

prescreening of the game is needed and game houses invest in focus groups that pretest the game multiple times before it is launched.

Free-to-play (F2P) business model is the most represented model in Apple's App Store. It means that the game is free to download, however players purchase items inside the game. (Park; Lee, 2011) Free-to-play game items can be categorized into three groups; 1) items connected to game personalization, 2) durable items which provide long-term benefit and 3) consumable items which provide instant benefit during the game (Špikić, Čudanov; Štavljanin, 2013). The rule of thumb when considering freemium as the right business model is that, if you have thought of game items in the game development phase, offer it as a free-to-play game (Morel, 2012).

The percentage of how many players are purchasing in-game items is called conversion rate (Principles of Mobile Game Design, 2013). Statistics show that only 2-6% of free-to-play game players purchase items inside the game (Morel, 2012; Tyni et al., 2011, 24). Hence there are over 90% of users who are playing but not purchasing in-game items. If 5% of the players are purchasing in-game items, it is considered high. Another important characteristic is ARPU (Average Revenue Per User) which is usually measured per month. If ARPU is greater than \$4 the game is doing well. If the conversion rate is 5% and ARPU \$4, the average paying player is spending \$80 on the game. (Principles of Mobile Game Design, 2013)

When only 2-6% of players are purchasing in-game items, it creates a risk for game developers when designing and later on launching games since the majority of the players are not producing revenue. The design of the game needs to be so exciting and fun to play that it attracts people to play and also pay in order to secure the revenue stream for the company.

Free-to-play game differs from premium in price and additionally in developing style. Since it is free the game can be altered after it has been launched. Game developers should pay a close attention to application store ratings, blogs and forums to find out the possible problems in the game and fix them (Morel, 2012).

Ad-supported games can be freemium or premium by nature, nevertheless the main source of revenues is different advertisements inside the game. Some of the most common types of advertisement are banner advertisement, video, offer walls and interstitials. Finally, there can be different hybrid models. The two most common hybrid models are: freemium with ad-supported and premium with in-app purchases. (Morel, 2012)

Choosing the right business model is naturally the most important step and it has to be chosen before the game has been developed. In the industry there are two main criteria for choosing the right business model; 1) content first, then money and 2) decide your business model early in the development process. (Morel, 2012) For example if the main monetizing method is advertisement, then the game developers need to leave room for them in the game.

2.2 Key factors in games

Sweetser and Wyeth (2005, 5-6) have identified 7 step criteria for a game which is enjoyable and causes player to experience the "flow" moment as presented in table 1. Games must keep player's concentration through a high workload but the tasks need to be sufficiently challenging to be enjoyable. An enjoyable game in the best scenarios helps player forget the track of time and lose the awareness of the surrounding world. (Sweetser; Wyeth, 2005, 4)

Table 1. Criteria for game flow.

Element	Criteria
Concentration	Game should require player to concentrate and he/she should be able to concentrate on the game. Game should grab player's attention from the start. They should not be overburdened with tasks they do not see important. The games should have a high workload while still being appropriate for player's skills.
Challenge	Games should be challenging enough and match player's skill levels. Games should be able to provide different challenge levels for different players. The level of challenge should increase when the player proceeds in the game.
Player skills	Game needs to support development and mastery of player's skills. Starting the game should be easy and no previous specific skills should be required from the player. Learning the tricks in the game should not be boring. Tutorials in the beginning of the game should be provided and they need to feel like the player is already playing. Game interfaces and mechanisms should be easy to master.
Control	Players should experience the feeling of control over the actions in the game. Especially they should feel they are controlling the character. They should be able to feel that what is happening in the game world has some meaning and players have the power to shape the game world.
Clear goal	Game should have clear goals which are presented at appropriate times and are easy for the player to understand.

Element	Criteria
Feedback	Player needs to receive relevant feedback at appropriate times. Player should always know the status and score.
Immersion	Player should experience deep but effortless involvement in the game. They should become less aware of their surroundings and they should experience an altered sense of time. They should feel emotionally connected to the game.

2.3 Service design

Service design has been described as the outside-in perspective on service development (Holmlid; Evenson, 2008, 341). Service design focuses on understanding users and their context, service providers, social practices and converting this understanding into development of evidence and service systems interactions (Patricio et al., 2011, 181). Service design systematically applies design methodologies and principles to the design of services. It assumes customer as the starting point and models how service can be performed keeping the customer the center of all actions.) Service design brings unique methods and perspectives to service innovation (Holmlid; Evenson, 2008, 341-342).

A customer-oriented service design approach begins with the customer. The whole process is iterative and the target is to create services that are useful, desirable, usable, efficient and effective. To fully understand the service experience it is crucial to walk through the service as the customer would. Understanding what he/she might find difficult or desirable are key points when crafting services. (Holmlid; Evenson, 2008, 342) In different phases of the service offering development process, different feedback tools and methods can be used. For example, customer surveys or feedback reports can be used to identify customer requirements. (Aurich et al., 2010, 139) Since free-to-play games are not locked with their design once they are launched, game developers should follow different feedback channels to identify possible mistakes and problems and improve the game.

3 Methodology

The empirical research in this study consists of the two consequential stages: 1) The voice-of-the-customer analysis and 2) service design optimization

In the first stage, we identify the voice-of-the-customer in the game context. This will include the identification of customer requirements for free-to-play game environment. We also connect these requirements into critical game service design factors that may have important role in terms of the customer value creation. In order to find out the relevant design factors of the service for the customer we have to analyze the interconnections of the service functions and customer requirements. We use Quality Function Deployment (QFD) framework to analyze the high level offering design before we approach further. QFD is an analytical tool that is designed to convert high-level business objectives into processes (Clegg; Tan, 2007). It is a method that is used for converting customer demands into quality characteristics, and developing product design by systematically deploying the relationships between these demands and the product characteristics (Lee; Ko, 2000). At this stage we utilized two workshops with gaming experts to understand the customer needs and to map the initial offering concept of a free –to-play game. The role of this first phase was to ensure the fit of the offering to the customer purchase process which also represents the company sales process quite well.

In the second stage of the research process, we will conduct an experiment for investigating the optimal design for free-to-play game. By utilizing the Design for Experiment (DOE) method, the example free-to-play game design is optimized for both maximizing the downloading of the game in the first place and for optimizing the in-game purchases afterwards.

The design of experiment (DOE) method was applied in the pre-study of factors affecting to the attractiveness of game playing environment. In DOE method the designs are changed systematically and data is collected accordingly on each changed designs (runs). We have selected a two-level factor design for the study. In the two level design, two alternative design options are identified for each identified factor. The levels are often presented as -1 and +1. Blackett-Burman L 12 design matrix was used in the DOE study. The Blackett-Burman matrix details can be found e.g. in Ledolter and Swersey (1997). The DOE matrixes provide determined order for factor levels under study. In other words, it specifies the combination of factors for each run. An advantage of the DOE is that only fractional number of combinations have to be studied still providing reliable results. This reduces significantly the time and resources needed for conducting studies. Another advantage of DOE is that when the combination of factors are studied simultaneously, the interaction of these factors can be analyzed. Two lead-user customers were used as a data source in a pre-study.

4 Results

4.1 Voice-of-customer analysis

Based on workshops within gaming experts, we identified four phases of customer gaming process that are: 1) interest to download the game, 2) Interest to purchase the game, 3) committing to the game and 4) sharing the experience of playing.

For the successful gaming experience, all of these phases have to work smoothly. The game features have to support these phases. Also based on a workshop with gaming experts, we identified general design factors of a free-to-play game. The design factors are: 1) playing time, 2) character of the game, 3) purchase type, 4) payment type, 5) changing game, 6) game identity, 7) social and 8) multiplayer. The design factors are explained in detail in table 2.

Table 2. Design factors.

Factor	Description
Playing time	Playing time can be either restricted or unrestricted. Restricted playing time means that there are some limits to playing time; energy, task, help from others etc. When playing time is unrestricted there are no limitations how much the player can play.
Character of game	Game's character can be either ad hoc or the plot is continuous. In ad hoc games the plot changes due to player's actions or due to the game itself; for example the player unlocks new levels or a new item is released by the game developer. A continuous plot refers to games which do not have for example visible levels but the game is going on without the player realizing he/she has earned enough points.
Purchase type	There are two options in purchasing type: purchase the game and purchase in game. Purchasing the game means that player downloads the game for his/her application store and pays for the game; this is known as a premium game. Purchasing in game means a free-to-play game, meaning the game is free to download but it has different items for sale. In some games in-game purchases are mandatory.
Payment type	Payment type can be either transaction or monthly payment. When the payment is transaction products and money are exchanged once. A monthly payment means that consumer pays some fee in a month in return for limitless or limited products.
Changing game	There are two possibilities in changes inside game: no and random. An example of no changes in game option is Packman. In Packman the player is always repeating the same steps, collecting the points and running away from the killers. When the changes are random, it means that the game changes and the player cannot affect to that; for example different enemies emerge and there are different steps to complete.
Game identity	Game's identity can be either standard or personalized. In so called standard games the player cannot affect to what the character looks like. In personalized games the player can for example, name the character, change hair color and outfits for free or purchase items for the character.
Social media	Social media factor means that the game has either connection to social media (for example Facebook, Twitter) or then not. Through social media players can post their scores and exchange items with other players.
Multi-player	Multi-player factors means that the player is either playing alone (option no) or then in interaction with other players (option yes) (Prototyping a mobile game, 2013).

We applied the QFD matrix to see how these design factors are connected and how they support to the phases of customer gaming process (see Figure 1). The Importance of these needs/wants was rated from the company perspective, the question being how important the phase is in the selling process of the game. The analysis reveals that all factors have fairly good fit to all of the elements of customer gaming process and therefore there is no need to drop any factor out of the further analysis. Also the analysis shows that none of the customer process phases lacks support from the design, so there is no need to add functions to the design.

Relationship Key: <div> <div>Strong</div> <div>Medium</div> <div>Weak</div> </div> <div> <div>Weight</div> <div>9</div> <div>3</div> <div>1</div> </div>				Product/Service Requirements & CTQs								Importance (1-Low, 5-High)	Total
				Playing time	Character of game	Purchase type	Payment type	Changing game	Game identity	Social media	Multiplayer		
Customers' Needs/Wants													
Interest to download				1	3				1	3	9	4,0	68
Interest to purchase				9	9	9	9	3	3	3	9	5,0	270
Immersion				9	9	9	9	9	9	3	9	4,0	264
Social interaction				3	3	3	3	3	9	9	9	3,0	126
													0
													0
CTQ Priority				94	102	90	90	60	82	66	144	728	
% Importance				13	14	12	12	8	11	9	20	100	
Priority rank				3	2	4	4	8	6	7	1		

Figure 1. The Quality Function Deployment Matrix to find the key design elements.

The most important factor is Multiplayer option with importance rate of 20%. However, all the functions are relatively close to each other CTQ priority scores. The only customer “want” that the offering does not support as well as others is Downloading, but it is still on acceptable level. Based on these results we decided to keep all the design factors in the further analysis.

4.2 Service design optimization

For conducting the DOE study, we first identified the critical service design factors affecting to the choice of the game with the expert group. The results of the factors and their levels (two level design) is illustrated in Table 3. 8 different factors represent important design elements for developing game service structure which appeal potential customers.

Table 3. Design of experiment factors and their levels

Factors	-1	1
Playing time	Restricted	Unrestricted
Character of game	Ad-hoc	Continuous plot
Purchase type	Purchase game	Purchase in game
Payment type	Transaction	Monthly payment
Changing game	No	Random
Game identity	Standard	Personalized
Social media	Yes	No
Multi-player	Yes	No

Based on the identified factors and their levels, the Blackett-Burman matrix design was adopted with one replication (12*2). It follows that the study design contains 24 runs (rows) where each row presents combination of designs which is measured by using 1-10 scale for service attractiveness (1= least attractive; 10= very highly attractive). The used datasheet for the used L12 matrix is presented in table 4.

Table 4. Datasheet for L12 DOE study.

Playing time	Characted of Game	Purchase type	Payment type	Changing game	Game identity	Social media	Multi-player	Attractiveness
Unrestricted	Continuous plot	Purchase game	Monthly payment	Random	Standard	No	Yes	4
Unrestricted	Continuous plot	Purchase in game	Transaction	Random	Personalized	Yes	No	8
Unrestricted	Ad hoc	Purchase in game	Transaction	No	Standard	No	No	7
Unrestricted	Continuous plot	Purchase game	Monthly payment	No	Standard	Yes	No	6
Restricted	Ad hoc	Purchase game	Monthly payment	Random	Personalized	Yes	No	2
Restricted	Ad hoc	Purchase game	Transaction	No	Standard	Yes	Yes	2
Restricted	Continuous plot	Purchase in game	Monthly payment	No	Personalized	No	Yes	2
Unrestricted	Ad hoc	Purchase game	Transaction	Random	Personalized	No	Yes	5
Restricted	Ad hoc	Purchase in game	Monthly payment	Random	Standard	No	No	1
Restricted	Continuous plot	Purchase game	Transaction	No	Personalized	No	No	3
Restricted	Continuous plot	Purchase in game	Transaction	Random	Standard	Yes	Yes	8
Unrestricted	Ad hoc	Purchase in game	Monthly payment	No	Personalized	Yes	Yes	3
Unrestricted	Continuous plot	Purchase game	Monthly payment	Random	Standard	No	Yes	7
Restricted	Ad hoc	Purchase game	Monthly payment	Random	Personalized	Yes	No	1
Unrestricted	Ad hoc	Purchase in game	Monthly payment	No	Personalized	Yes	Yes	10
Restricted	Continuous plot	Purchase in game	Transaction	Random	Standard	Yes	Yes	5
Restricted	Ad hoc	Purchase in game	Monthly payment	Random	Standard	No	No	1
Restricted	Continuous plot	Purchase in game	Monthly payment	No	Personalized	No	Yes	2
Unrestricted	Continuous plot	Purchase game	Monthly payment	No	Standard	Yes	No	1
Unrestricted	Ad hoc	Purchase game	Transaction	Random	Personalized	No	Yes	5
Unrestricted	Continuous plot	Purchase in game	Transaction	Random	Personalized	Yes	No	5
Restricted	Ad hoc	Purchase game	Transaction	No	Standard	Yes	Yes	4
Restricted	Continuous plot	Purchase game	Transaction	No	Personalized	No	No	10

The analysis is done after the data collection with the Minitab software. The software allows us to provide both numerical and graphical information about the studied design. In this case we investigate the effect of the design change of each selected factor for the game customer attractiveness. As shown in the main effect plots in figure 2, payment type, playing time, and character of game present most significant effect on attractiveness. Therefore, these factors seem to be most important in terms of game design choice.

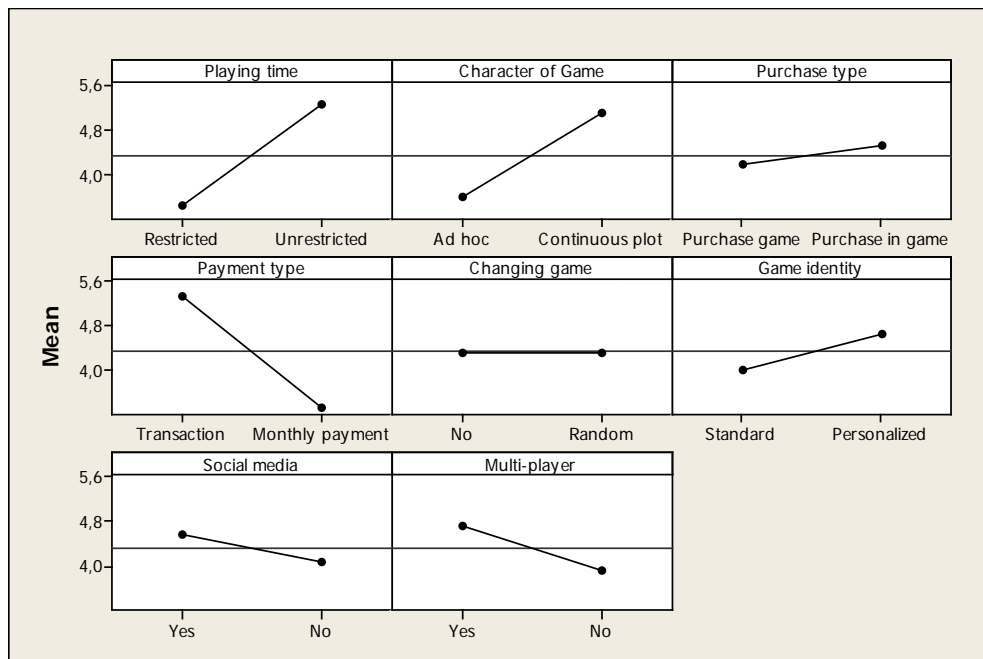


Figure 2. Main effect plot for game attractiveness.

Based on the DOE study, the optimal design for the free-to-play game service is presented in Table 3. An optimal design is calculated with Minitab software based on the main effects of individual plots and their interaction with each other. As shown, only in Payment type factor the -1 (transaction) is provided for optimal design. The analysis shows that when the optimal design is adopted, the predicted attractiveness of the service model is 6,833 out of 10 as maximum. It is thus expected that this combination is most attractive design for the customers.

Table 5. The optimal design.

Factor	Outcome of DOE	Meaning
Playing time	1	(Unrestricted)
Character of game	1	(Continuous plot)
Purchase type	1	(Purchase in game)
Payment type	-1	(Transaction)
Changing game	1	(Random)
Game identity	1	(Personalized)
Social media	1	(No)
Multi-player	1	(No)
Predicted responses Attractiveness	6,833	

5 Discussion

In this study we wanted to investigate the optimal way to design a free-to-play offering. The changing nature of the industry and growing demands of the customers force game developers to develop games their customers really want to play. When only 2-6% of players of a particular game are producing revenue to the developer, the game developers need to think carefully what kind of games should be created and what aspects they should include.

We used two different methods to optimize the design for the customer and the firm. First we used voice-of-customer based QFD process, where the initial check of the design factor relevance was tested. Since the focus was on generally in playing the participants put impact on issues that might have an effect to the different phases of customer gaming process. For example multi-player option was the most important factor in voice-of-customer and the reason behind this could be ability to play with friends or friends are already playing and you feel the social pressure to play.

After voice-of-customer analysis was completed, we used DOE process where we asked the game experts to evaluate the attractiveness of different offering combinations and then used the Minitab to analyze the attractiveness of single factors in the design. In Design of Experiment phase the participants were asked to think about a specific game and how they would value each aspect. In voice-of-customer analysis multiplayer was the most important factor, however in DOE it was not seen important at all. This can be explained by the different level of analysis. In DOE model the participants were thinking of a specific game and to these specific participants, multiplayer option was not important.

The optimal free-to-play design according to this research is a game where playing time is not restricted, the plot keeps evolving, it is free to download and purchasing happens inside the game, payment is transaction, the game changes randomly, character of the game can be personalized and there is no connection to social media and you are playing solo. Unrestricted playing time and continuous plot were the most important things for the participants.

The result of this research is the above mentioned optimal free-to-play design but what needs to be remembered is that not all consumers are willing to play similar games. In mobile games two different market segmentations should take place. Naturally consumers want to play different kinds of games, for example war games or puzzle games. This is the first level of segmentation. A second level of segmentation should happen on a level of individual game. Some consumers want to purchase in-game items in a continuous changing game world, other players value free playing or purchasing the game as it was before. Since the statistics show that only 2-6% of players purchase in-game items the game developers should offer options for those consumers who wish to play mobile games but are not willing to purchase in-game items.

6 Conclusion

This research focuses on identifying the optimal free-to-play design hence the contribution is both theoretical and methodological. This study contributes to the service design literature (e.g. Holmlid; Evenson, 2008; Aurich et al., 2010) by introducing a systematic methodology for customer driven service design in service companies. Additionally a novel method, Design of Experiment was introduced alongside with voice-of-customer. With this way the consumers can be take part into game developing process by clearly stating what kind of games they are willing to pay, in addition when they are willing to purchase games or in-game items.

This study could be improved in different ways. The methodology in hand has not been used in this kind of research before, hence it needs some more runs. The study focus was in testing the methodology and process and therefore we did not use large customer samples for the voice-of-customer part, but instead used the company experts in evaluation. It would be beneficial to use larger customer study in the first phase of the process. Additionally the workshops should be repeated with higher number of participants in order to see the incremental issues. Games are highly related to

experiences and different people experience then differently and therefore value different issues. In the attractiveness evaluation in with DOE the different customer segments should be recognized and the population should represent all relevant segments. Increasing the number of participants and possibly conducting qualitative interviews we could identify different important aspects.

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Viability template – a practical tool for assessing viability of transformative service innovations in health care context

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The paper develops and showcases the viability template which is designed to assess the innovation potential of transformative service ideas. Based on the transformative service research and innovation literature, we highlight the importance of novel simplifying technology, supporting value networks, cost-effective business models, and regulatory environment which enable renewal of the prevailing market practices. We operationalize the template as a set of questions and assess the innovation potential of three pilot cases on new transformative services. The pilot cases present technologies that aim to develop and spread the usage of user-friendly electronic health care services in Finland.

1 Introduction

Transformative service research (TSR) combines transformative consumer research with service research in order to inform how to improve the consumer and societal well-being. So far, the emerging field has not paid particular interest in transformative service innovations, which we define as the evolutionary process whereby organizations or individuals transform new, useful knowledge, in order to advance well-being in the service ecosystem. In fact, most of the empirical studies on innovation in health care focus on idea generation rather than dissemination (Lämsäsalmi, Kivimäki, Aalto, & Ruoranen, 2006). There is a dearth of research in innovation in public health services that discusses the role of institutions in dispersion of service idea to service innovation. This stands in contrast with strong focus on practices and existing institutions that otherwise characterize the industry. Often the overall improvements in health care services are based on an intertwined set of different types of innovation: product, process, organizational and market innovations (Windrum & García-Goñi, 2008). The consumer well-being is usually most apparent in product innovations in e.g. new medical technologies. The direct well-being effects of the other innovation types are more vaguely observed. Due to many interconnections and needs for proof of concept, transformative service innovations in health care are challenging to implement.

We acknowledge that there is an abundance of seemingly good ideas that suggest how technology or process reconfigurations could be employed to increase well-being in health care context. Nevertheless, before these ideas can be referred as transformative service innovations, they need to be accepted and adopted in parallel by multiple stakeholders, such as service provider's management and employees, service purchasers, authorities and service users, or consumers. And then they need to be diffused through market practices by institutionally embedded actors. These practices may be in line with the original plan for value proposition or stemming from unforeseen stakeholder activities.

The objective of this study is to increase understanding on institutionalization in transformative service innovation processes in the context of health care. Furthermore, the study aims at building up a template for analyzing the different extents of viability of transformative service innovations. By viability we refer to the transformative service innovation which 1) includes a novel idea that can be deployed into practices that increase well-being in service ecosystem, 2) is accepted and adopted by different stakeholders and 3) has suitable features to attract diffusion in its innovation and stakeholder networks. We build on TSR, innovation literature and institutionalization processes to understand how disruptive ideas spread to advance consumer and societal well-being. We operationalize a viability template that can be employed to assess the viability of potential transformative service innovations. In the empirical part, we showcase the developed viability template by assessing three potential innovations in health care context that aim at improving well-being through increased efficiency and empowerment of patients. In addition to showing how the template was used in evaluating the viability of these cases, we discuss how the template could be developed further.

2 Theoretical background

2.1 Transformative service research

Anderson et al. (2011, p. 3) define TSR as “the integration of consumer and service research that centers on creating uplifting changes and improvements in the well-being of consumer entities: individuals (consumers and employees), communities and the ecosystem.” TSR focuses on the socially oriented contexts such as health care and education, in which the nature of service speaks to consumer's and society's well-being. Instead of focusing merely on customer satisfaction and loyalty, this emerging area pays attention to the effects on well-being of multiple stakeholders.

Research on consumer behavior has paid attention to health for long. For instance, Neergaard and Irvine (1989) conducted a study on underlying motivations, factors, and processes involved in family management of well-being. Since then, the health care-related consumer studies have expanded to cover, for instance, electronic word-of-mouth on health social networking sites (Liang & Scammon, 2011), men's behavior as health consumers (Buckley & Tuama,

2010), and the choice of non-conventional treatments (Rajamma & Pelton, 2010). Despite health care consumption has been approached from various directions, there is surprisingly little research on health care innovations in consumer research. As a notable exception, Caldwell and Kleppe (2010) studied the role of early adopters in the diffusion of health care innovations. They underscore that public demonstration by early adopters reduces consumer resistance to HIV/AIDS public health innovations.

Similarly, service research has mostly neglected health care innovations. However the readiness of both health service providers (Okazaki & Castañeda, 2013) and patients (Lanseng & Andreassen, 2007) in adopting new technologies have been taken into account. Lanseng and Andreassen (2007) focus on early adopters and their expectations of the technology. Similarly, Okazaki et al. (2013) focus on perceptions of the technology as well as personal characteristics of the physicians. Heikkilä et al. (2014), in turn, analyse the feasibility of a health service innovation and its business model from both the provider network's and pilot customer's point of view, and Nikayn et al. (2014) discuss its social implications. Although these studies increase our understanding of the behavior of pioneers in adapting health care innovations, they are limited in terms of raising awareness of the institutionalization of health care innovations into market practices.

The importance of institutionalization is particularly discussed within the service ecosystems approach (Vargo & Akaka, 2012; Vargo & Lusch, 2011). In service ecosystems approach, actors are perceived as being embedded in social context in which they integrate resources to increase their own well-being. In other words, value is always co-created with multiple stakeholders in context. As actors are embedded in social structures, it is perceived that institutions both enable and constrain value creation and the adoption of new practices. Although health care practices have been studied with service ecosystems approach (McColl-Kennedy, Vargo, Dagger, Sweeney, & Kasteren, 2012), it remains unknown how institutionalization of these practices occurs. Particularly, this is an important question in the health care innovation setting that introduces new or changed practices.

2.2 Innovation

Innovation is considered as a multi-stage process whereby organizations transform ideas into new/improved products, service or processes (Thompson, 1965), in order to advance, compete and differentiate themselves successfully in their marketplace (Baregheh et al., 2009). Conventionally, innovation is defined as "the process of bringing new products and services to market" (Hauser, Tellis, & Griffin, 2006, p. 687). In other words, innovation is expected to substitute existing solutions.

A recent view in marketing perceives markets as institutions (Araujo, 2007). As a result, it is understood that innovation is not only about new or improved products and services but something that is different in the market, i.e. institutional framework. Marketing can enable the maintenance of the institutional framework or destabilize it, for instance through introduction of innovations. Therefore, it is important to understand "when are markets ready for disruptive innovations" (Klenner, Hüsiger, & Dowling, 2013). Disruptive innovations were typically conceptualized as lower quality solutions that eventually gain market share from established companies (Christensen, 1997). In brief, the solution needs to be affordable, simple, and substitutive. In addition, the market leader's solution needs to be more than good enough, and the disruptor needs to be able to design a novel business model (Christensen, Johnson and Rigby, 2002). The other type of disruptive innovation, "new-market disruption", takes place when the (existing) solution in one market can be brought to a new market and serve customers' needs not served by the existing incumbents. Again this requires that the business logic around the existing technological solution is redesigned to fit the new market.

There is a rich literature on innovation diffusion. Following Rogers (2003) innovation diffusion process comprehends the adoption processes across several individuals over time. But, in many instances, also in health care, adoption and diffusion occur among organizations shaped by their structures and hierarchies. Slow diffusion of innovations is acknowledged in health care. Diffusion of innovations in healthcare in particular require credible evidence base, observability, strong leadership and trust (Berwick 2003) and it also requires strong social interactions between professional groups and suitable organizational contexts (Fitzgerald, Ferlie, Wood, & Hawkins, 2002).

The review of empirical studies on the assimilation of technologies in health care by Robert, Greenhalgh, MacFarlane and Peacock (2010) points out the importance of understanding how routines emerge and are shaped through the production and reproduction of patterns of activity, how actors are influenced by pre-existing social structures in their technology adoption, and how we need a holistic model to understand socio-technological networks in diffusion of health care innovations. In brief, it is seen that it is not enough to have a simplifying technology that is new and unique to potential customers. Instead, developers of health care innovations need to take into account routines, social structures and regulations in order to understand whether a novel idea has potential to become market practice. Also in public health care which is often organized as quasi-markets (Bartlett & Le Grand 1993), it should be noticed that the adoption of innovations requires acceptance from both by purchasers and producers of the services.

And last, taking the service ecosystems approach to innovations, we need to expand our view to cover the ecosystem or the value net that is involved in institutionalizing the innovation: the service providers and patients (consumer research) and wider social context (service research). We acknowledge that the view on consumer response needs to be widened to several actors in the market. These actors form the innovation networks, i.e. "the configurations of strategic entrepreneurial nets aimed at improving the effectiveness of innovation performance" (Corsaro, Ramos, Henneberg, &

Naudé, 2012, p. 54). In this view, health care innovation is seen more holistically through multiple actors in the network.

2.3 Synthesis and the development of viability template

The study by Caldwell and Kleppe (2010) hints that consumer research sees institutionalization as an important step in the diffusion of health care innovations. However, this question as well as discussion on health care innovations in general has been missing in consumer research. However, dispersed studies in the field of TSR have guided us to focus on certain characteristics that may be used to assess the innovation potential *ex ante*. The innovation needs to be

- novel compared to substitutes
- fit with existing practices (legal and regulation)
- beneficial to users and cost-effective for providers
- beneficial to the value network

Christensen et al.'s (2009) framework synthesizes the views presented above. Their model consists of enabling elements of disruptive innovation: 1) Sophisticated technology that simplifies, 2) Low-cost, innovative business models, 3) Economically coherent value network and 4) Regulations and standards that facilitate change.

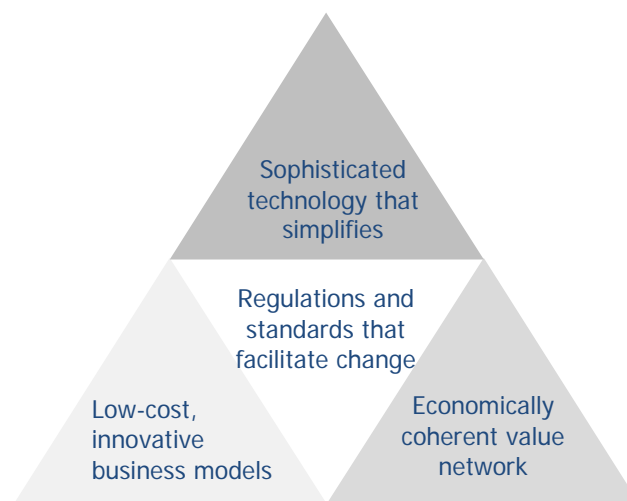


Figure 1. Elements of disruptive innovation by Christensen et al. (2009).

As the model above lacks operationalization, we synthesize the elements of disruptive innovation in the template that can be used in analyzing the viability of health care value propositions. As a practical tool, the viability template may be used to assess the innovation potential of transformative service ideas at least in two scenarios. First, it may be used for funding decisions to cherry-pick which projects have the most diffusion potential. Second, it may be used for business development by increasing understanding on the potential barriers for diffusion in the wider institutional setting.

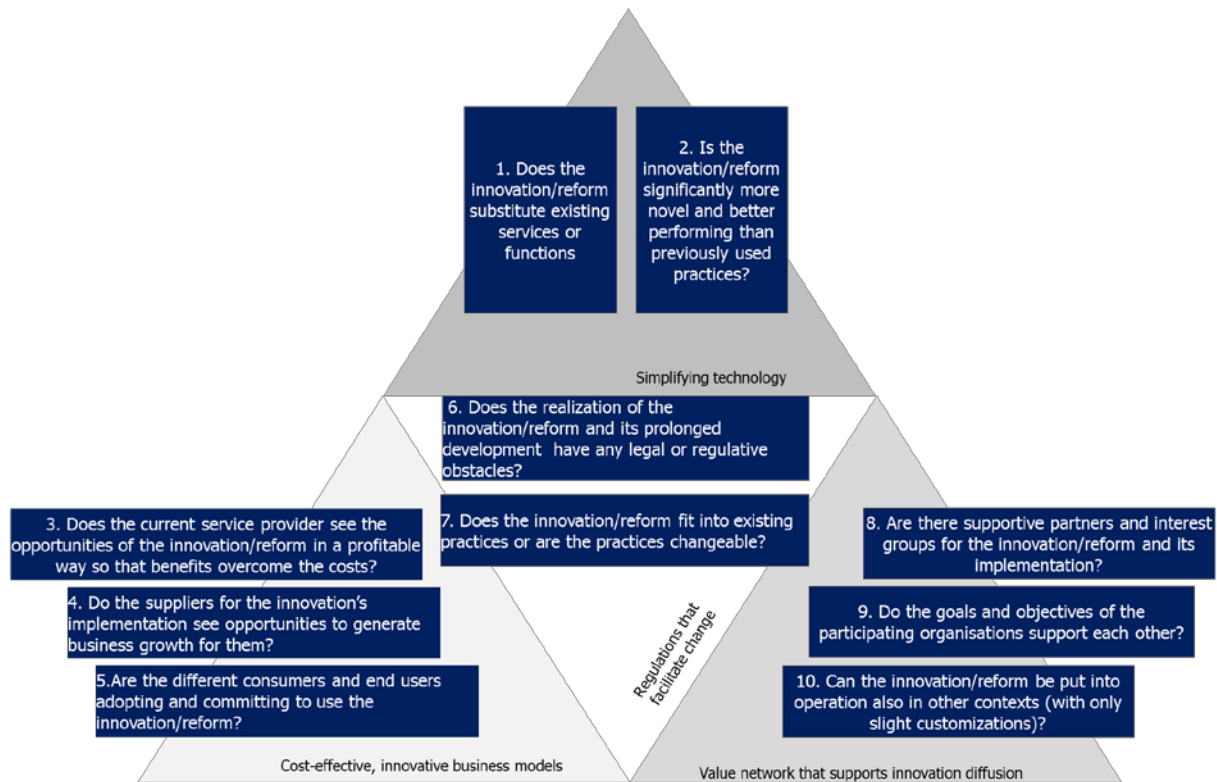


Figure 2. Viability template of transformative service innovations.

Viability template is based on Christensen et al.'s (2009) elements of disruptive innovation. The uppermost triangle represents technological solutions, which enable some processes to be carried out in a simpler or more effective way. For its assessment following questions were derived that focus on value-in-use-in context (Vargo & Lusch, 2008):

- 1) Does the reform substitute existing services or functions?
- 2) Is the reform significantly more novel and better performing than previously used practices?

New technology enables value creation either by reaching a new performance level in some respect, or by simplifying previously used methods. When renewing health care services the substitution is very important feature. If the reform does not replace any older functions, its adoption would only increase the service system's size unless it enables very novel and radical value increase. Overlapping information systems and double bookkeeping of health information entries is a typical example of uncompleted substitution.

In the lower left corner, the service provider's need to have functional business models when using the reform so that consumers will value and use the provided service. We extend the business model view as to what are the incentives of different stakeholders to change their behavior in accordance with the reform. Thus, we extend the view to wider value co-creation opportunities.

- 3) Does the current service provider see the opportunities of the reform in a profitable way so that benefits overcome the costs?
- 4) Do the suppliers for the reform's implementation see opportunities to generate business growth for them?
- 5) Are the different consumers and end users adopting and committing to use the reform?

Willingness of these key stakeholders to adopt the use of reform is crucial for its viability. Decision-making becomes often monetized, requiring calculations and proof of concept that reform's adoption will lead into a positive surplus compared to existing situation. However, even if there are incentives to adopt the reform, two more elements affect its rate of success. Regulation and standards are located in the center and determine what kinds of changes are allowed and what not. Thus, the viability template takes into account not only various stakeholders but the influence of institutions enabling and constraining value co-creation and the diffusion of market practices (Akaka, Vargo, & Lusch, 2013).

- 6) Does the realization of the reform and its prolonged development have any legal or regulative obstacles?
- 7) Does the reform fit into existing practices or are the practices changeable?

Rules, standards and legislation are society's formal means to ensure fair, safe and ethical courses of action. And naturally they are drawn up only afterwards of any innovation emergences. Informal routines and practices are rooted in organizations' culture, and changing of them requires recurrent communication and demonstrations.

Then the rightmost triangle describes the value network that affects the reform's diffusion. If the reform doesn't diffuse to other organizations, it easily can be seen only as an experiment and it will not reach its full coverage. Here, it is emphasized that support for the reform's diffusion can only be expected when multiple stakeholders experience mutually beneficial outcomes (Maglio & Spohrer, 2013)

- 8) Are there supportive partners and interest groups for the reform and its implementation?
- 9) Do the goals and objectives of the participating organisations support each other?
- 10) Can the reform be put into operation also in other contexts (with only slight customizations)?

Viable innovation requires that there are no major conflicts in interests of different stakeholders around the innovation. Mutual understanding of the goals and motives of each partner helps innovation adoption and diffusion considerably. Low need for modifications and customization implies for a greater simplicity of innovation and therefore greater chances for diffusion. The questions may be developed further but as such it synthesizes important themes raised in transformative service research, innovation literature, as well as institutional theories. In the following, we present three cases which are all assessed by using the viability template.

3 Research Design

The empirical study is built on the analysis of three pilot cases on transformative service innovations. These pilots were sponsored by a national innovation fund institute promoting projects aiming for sustainable well-being in Finland. One of its divisions aims to contribute to the development of user-friendly electronic services for health promotion and create conditions for Finland to become a pioneer in electronic welfare. The division has executed its mission by sponsoring research in the theme, influencing opinions and launching and funding experiment projects where new innovative ideas are put into practice and evaluated.

After running several pilot projects in health and wellbeing area, the institute commissioned the researchers to help analyzing the viability of their on-going and future pilots. The aim was to have a practical tool, a template that the funding institute can apply to estimate the potential viability of a reform (its strengths and weaknesses) and to focus their efforts in advancing its diffusion.

3.1 Cases

In our study in collaboration with the institute three pilot services were selected as interesting examples of potential transformative health care reforms: 1) electronic maternity card, 2) electronic tool for assessing the need for medical care for birth control, eating disorder and tooth crack and 3) electronic service to motivate senior citizens to do physical exercises. We do not claim that these transformative service ideas are necessarily truly transformative but they represent cases in which the service provider aimed at transformative service innovation.

An electronic maternity card currently piloted in one city region in Finland, involves replacing the traditional paper-based information storage procedures with an electronic health record service that allows expectant mothers to access all information relating to their pregnancy online. The objective of the electronic maternity card is to improve the exchange of information between maternity clinics, expectant mothers and hospitals, to reduce the likelihood of mistakes, to improve customer service, and to make monitoring high-risk pregnancies more efficient. Besides self-monitoring their health expectant mothers can use the electronic service to share information from their pregnancy with their family and friends if so willing.

In the second service pilot concerning assessment of need for medical care the service provider management had a strong vision to speed up the triage determination process by replacing phone interview with an electronic form in selected patient groups. This freed nurse resources for other tasks and encouraged some customers to seek care which would not otherwise have done that. It was demonstrated that carefully planned electronic procedure can be created but traditional phone interview was still required in some situations.

The third pilot focusing on senior services showed that a tablet computer is a suitable and engaging platform also for elderly people to receive health related information and instructions if suitable contents are upheld. Technological execution was considered to be simple but the contents and user guidance are the areas which need most of the development efforts.

3.2 Data collection

Our assessment of the cases is based on 12 semi-structured interviews of the service providers, system providers and responsible project leaders at the funding institute. Each interview lasted from 1 hour to 2.5 hours. In addition, we collected secondary material from the funding institute (contracts, minutes of board meeting, and final reports when available) to justify our assessment.

Table 1. List of interviewees.

CASE	STAKEHOLDER	INTERVIEWEES BY POSITION
Electronic maternity card	Service provider	Head Nurse, Maternity Clinic
		Executive Medical Director, Maternity Clinic
		Coordinator, IT Management of City T
	System provider	Chief Executive Officer, IT Company A
		Project Manager, IT Company A
	Funding Insitute	Senior Lead
Medical care need assessment	Service provider	Director of Development, Medical Care Organization
	System provider	Project Manager, IT Company B
Senior tablet computer service	Service provider	Director of Development, City J
	System provider	Project Manager, University
		Researcher, University
	Funding Insitute	Specialist, Systems

Our interview data is solely based on the viewpoints of service and system providers. However, to overcome the absence of end-customer view, we had access to consumer satisfaction survey results conducted in two of the cases, and tested all services by ourselves as well. As a result, the template may not cover all aspects in the assessment. Nevertheless, the data indicates the usability of the template.

4 Empirical findings

We applied the viability template presented in this article to assess the successfulness of the pilots. The results are presented in the Figure 3 using green, yellow and red colors to describe our interpretation of the status of the pilot regarding viability questions. Green means that the pilot is seen not to have problems regarding the specific item, whereas yellow points out some problems and red serious problems.

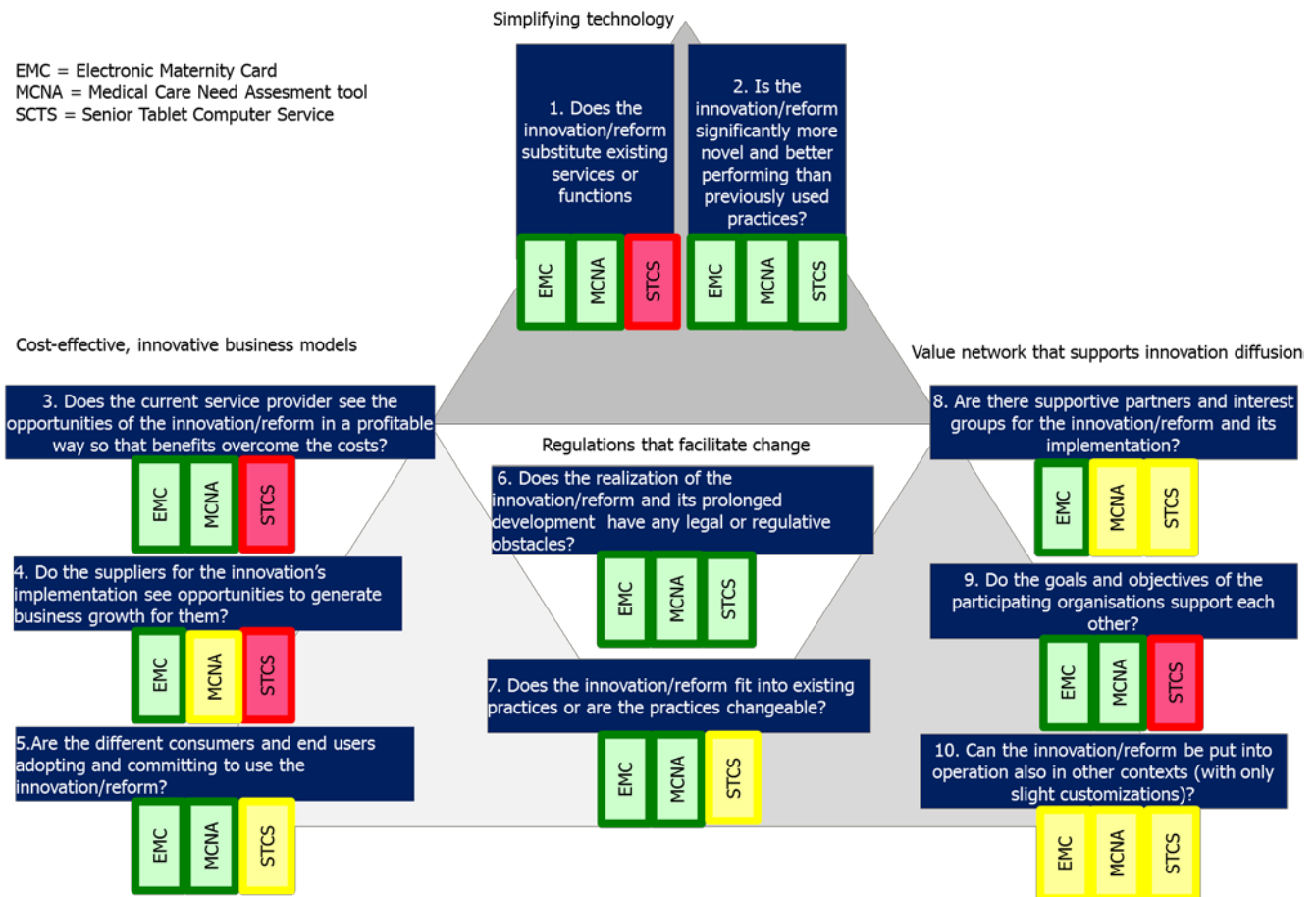


Figure 3. Three pilot cases assessed with the viability template.

According to our analysis two of the pilots performed well in majority of viability issues. The first pilot (electronic maternity card, EMC) passed all questions with green colours, except for one yellow grading concerning adaptability of the reform in other context with differing information systems and interoperability requirements. The reform may require heavy investments in electronic patient records and can thus face challenges in wider diffusion at the time when public health care is looking for ways to cut spending instead of investing more.

Similarly, the expansion of the second reform (medical care need assessment, MCNA) to new contexts requires integration and tailoring. Furthermore, the system provider of case 2 needs to put more effort if it desires to expand the adoption of the reform. The new practice has been accepted within its current special clientele. However, more efforts are expected if the innovation is expected to have wider societal consequences.

The third pilot (senior tablet computer services, STCS) had many severe issues to tackle, predicting failure of the reform. Especially the business model of the reform was not successful and the parties did not see prospects for profitability or business growth. These challenges are crucial when the reform is not substituting existing services. The participating organizations are not committed to the wider diffusion of innovation, as they lack mutual goals. Also current funding system is not supporting the idea becoming a market practice as public and private partners are not interested in investing in preventive health care technology.

5 Discussion

This study mostly focuses on representing the practical tool for assessing potential transformative service innovations in the health care context. The assessment of the cases indicates how the viability template can be employed to understand the rich institutional context of new technology. The template combines together important issues that need to be considered in assessing the innovation's diffusion potential. The template is thus helpful in making funding decisions and in pivoting transformative service ideas.

The practical tool enabled us to focus on most crucial questions on the institutional setting surrounding the potential innovation. Thus, we were able to provide the funding institute important information that remains often overlooked in decision making and ex post analysis.

It should be emphasized that the red light indicating problems in the institutional setting does not simply translate as "no go". Instead, these lights indicate the action points that require further attention. In case, new simplifying technology does not benefit from wide support, it is possible to influence other stakeholders in various ways. For instance, a demonstration can be developed to showcase the benefits of new technology. Second, opinions of authorities

and other key stakeholders can be changed with active lobbying. Third, stakeholders may become more committed to the innovation diffusion if they participate in the development process. Also cases implicated that in the regulated markets or quasi-markets of health care, procurement practices typically neglect to value propositions that promote diffusion or R&D of the service.

As a scientific contribution, we continue the discussion on assessing the role of institutional setting in the diffusion of innovations. Our study can be considered as an approach to operationalize “disruptive susceptibility” (Klenner et al., 2013), which focuses on the readiness of innovation networks to adopt new solutions. Similar to the study by Klenner et al. (2013), we extend the view from the service providers, customers and competitors to more general market characteristics. Readiness for change is important, as institutions strongly affect not only private market characteristics but public service innovations. For instance, non-profit organizations always engage in maintenance or transformation of dominant institutional logic depending on whether it fits the actor’s aims or not. In line with Coule and Patmore (2013) we conclude that in order to engage in deinstitutionalization or transformation of existing institutions, the service provider needs to have a value proposition that resonates with aims of potential network partners.

It is unquestionable that the practical development and scientific approval of the developed template require further evidence. There is a need for theoretically valid set of questions. The questions represented in this paper are selected intuitively by consulting the related literature. Before the viability template is adopted in wider use, there is a need to ensure that all important questions are asked. Despite these remaining shortcomings, we believe that our study advances the assessment of the institutional setting that is still often overlooked in the general innovation literature.

Particularly, our study takes a strong position in emphasizing the role of networks and institutions in health care context. The context is characterized by separation of buyers (or financiers) and users of innovations. This is an important notice that should be taken into account in assessing the generalizability of the template in other contexts. Therefore, we invite other scholars to test the tool not only in the context of health care but in institutional settings that represent more traditional business markets. On the other hand, we also invite better understanding of the quasi-market context in health care.

6 Conclusions

In the institutionalization process of transformative service innovations we identify the importance of novel technology that outperforms existing solutions, value network that supports innovation diffusion, innovative business models that are cost-effective, and operative environment that supports renewal of the prevailing practices. We propose that in order to transcend from service ideas to transformative service innovations, all or most of these elements need to be aligned during the innovation process.

We contribute to the transformative service research by empirically explicating how to assess institutionalization potential in innovation process. In addition, we inform service innovation literature by conceptualizing service ecosystems approach to analyze the diffusion of innovative market practices. Particularly, we highlight the importance of environmental fit, or technology-market interplay, in the service innovation process. For practitioners (funding agencies and business developers), we provide a set of concrete questions that may be addressed in assessing and enhancing transformative service ideas. Last, we acknowledge that the development work of the practical template remains in its early stages. Therefore, we invite other scholars and practitioners to advance our understanding on how to assess the influence of institutional setting on the viability of transformative service innovations.

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Value co-destruction in transformative service practices: Information and knowledge processes in public health care

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The paper discusses how the information and knowledge processes in the public health care context obstruct the value co-creation by patients, their families, and the health care organisations. The empirical research focuses on the childhood obesity care. The results indicate how involvement of patients and their families in the process does not always enhance value creation in the patient's well-being. Particularly, some families deny the problem and some have needs that are not taken into account by the health care professionals. By identifying barriers in information and knowledge processes, we provide practical recommendations and contribute to the emerging transformative service research.

1 Introduction

Value creation in health care is a billion dollar question that requires increasing scholarly attention from multiple scientific fields. Particularly, transformative service research (TSR) has recently emerged to tackle this issue. Anderson et al. (2011, p. 3) define TSR as “the integration of consumer and service research that centers on creating uplifting changes and improvements in the well-being of consumer entities: individuals (consumers and employees), communities and the ecosystem.” TSR focuses on the socially oriented contexts such as health care and education, in which the nature of service speaks to the consumer's or society's well-being. “Although these service contexts are examined in terms of customer satisfaction and loyalty, arguably even more important is exploring their effects on well-being outcomes.” (Anderson et al., 2013, p. 1203) TSR focuses on how the interaction between service providers and the consumers (incl. families or communities) influences the well-being outcomes of both actors (Anderson et al., 2013). Despite having an interest in transformative outcomes, emerging TSR literature has not yet paid particular interest in either the role of patients or service providers in the co-creation of well-being (Rosenbaum et al., 2011). In this paper, we tackle this question in the context of childhood obesity care and prevention.

Support to lifestyle changes have been found crucial in the treatment of childhood obesity (Luttikhuis & Baur, 2009). Therefore, the available studies on childhood obesity typically encourage the involvement of families in the treatment. In fact, the research findings of Golan, Kaufman and Shahar (2006) suggest that children should be even omitted from active participation in lifestyle counselling, and the health care professionals should focus on parents to fight childhood obesity.

Instead of limiting the study to individual patients, this study therefore extends the view on value co-creation to the requested collective level of consumer entities, or ‘third parties’ (Anderson et al., 2013; Hardyman, Daunt, & Kitchener, 2014), i.e., families of child patients. Furthermore, whereas the study by (McColl-Kennedy, Vargo, Dagger, Sweeney, & Kasteren, 2012) focused on customer value co-creation practices, we extend the view to the organizational practices of service providers as requested by (Rosenbaum et al., 2011), i.e., institutions and norms surrounding the healthcare professionals.

We build on multidisciplinary theory basis by incorporating service research with information studies. The empirical part consists of a qualitative case study in the context of Integrated Care Pathways (ICPs) of two Finnish University Hospital districts. The empirical data, collected between 2009 and 2012, consists of semi-structured interviews of health professionals in primary and special health care, of children and their mothers, a family questionnaire, and care path instructions and memos of an ICP work group.

2 Theoretical background

2.1 Value co-creation (and co-destruction) in social context

Porter (2010, p. 2477) defines value in health care as “the patient health outcomes achieved per dollar spent”. In service research value has been understood as a much richer concept that involves experience beyond physical changes and monetary measures. In service research, value is perceived as a phenomenological and contextual construct. This means that value is always determined by an actor in his or her own context (Vargo & Lusch, 2008). Particularly, this has been emphasized in S-D logic that has shifted the focus from value-in-exchange to value-in-use and further to value-in-context. Value-in-context has been defined as “an improvement in system well-being and we can measure value in terms of a system's adaptiveness or ability to fit in its environment.” (Vargo, Maglio, & Akaka, 2008, p. 149)

By emphasizing the context in value creation and determination, it has become evident that customer's service ecosystems are important in value co-creation. Customers are not perceived as isolated actors but as parts of wider

communities within which they interact and integrate resources. This insight has resulted in studies that underscore the importance of multiple actors (Arantola-Hattab, 2013; Fyrberg Yngfalk, 2013), such as families as value co-creators.

Particularly, health care typically involves multiple interactions with different health professionals. Fyrberg Yngfalk (2013) emphasizes that these multiple actors may have a differing view on the value creation process, and some of the interactions may even be contradictory from the perspective of the patient's value creation. In other words, actors are not always creating value by integrating resources. In fact, studies indicate that customers may "misbehave" (Echeverri, Salomonson, & Aberg, 2012) and the service exchange process may end up in value co-destruction (Cova, Dalli, & Zwick, 2011; Echeverri & Skålén, 2011)). In order to avoid value co-destruction, the service provider should be able to spot the misbehavior and guide the customer accordingly. In addition, the literature indicates that value may be co-deconstructed as a result of destructive behavior of both customers and service providers.

Zainuddin, Previte and Russell-Bennett (2011) have studied health services' outcome in the context of preventive public health care. In the study, they identified themes that explain value determination, namely convenience, control, peace of mind, behavior as reinforcement for beliefs, identification of self as an influencer, and benefit of behavior to others. In this sense, it is understandable that improved health is not the only type of benefit that is provided by the preventive health care. Also, this underscores that service providers and the patients have probably different viewpoint on value and its measurement, depending on their social context.

McColl-Kennedy et al. (2012) have studied value creation practices in the health care context. They show how patients contribute to their own value creation by managing their health care. In their approach, they describe activities of patients positively affecting their quality of life. However, Berry and Bendapudi (2007) have highlighted that patients may be reluctant to participate in the coproduction process, as healthcare service is something they need but not necessarily want. Olsson (2014) has, in turn, noted that the reluctance to participate in the process may stem from lack of information or wrong type of information. Therefore, in this study we take a closer look at information and knowledge processes in order to identify the barriers for value co-creation in health care.

2.2 Information and knowledge processes

The terms knowledge and information are used in knowledge management literature sometimes interchangeably. In this paper, the term information is used when discussing information transfer of explicit documents or messages through some media or in human interaction. Knowledge sharing (van den Hooff & Huysman, 2009) is, in turn, an activity in which knowledge is made available to another or others in personal interaction and can result in construction of common meanings and creation of new knowledge; that is building understanding and learning.

Treatment of patients requires care decisions which are based on patient information (Gorman, 1995) professional medical knowing, information about guidelines and practises, work experiences, and ethical principles of care. In the course of the treatment, patient information is typically documented in the electronic patient records (EPRs). These entries form an information and knowledge reserve for other professionals in the health care organisation.

According to the idea of value creation by Normann and Ramirez (1994), knowledge processes require interaction in the value network between the stakeholders. Implicitly this outlook thus emphasises the importance of knowledge sharing. Knowledge sharing involves an individual who guides another individual through using his own thinking or insights to help them see their own situation better. Successful knowledge sharing requires awareness of the receiver's knowledge needs or gaps, use and purposes (McDermott, 1999).

Riege (2005) identifies barriers to knowledge sharing at the individual, organisational and technology levels. At the individual level these include structural, cultural and personal barriers, and at the organisational level mostly structural and managerial problems. Furthermore, technology must support the activities of the organisation. Riege emphasises the role of management to support, motivate, and encourage individuals to transfer and disseminate both existing knowledge and to apply newly generated knowledge.

As noted by Riege (2005), structure of the social network and especially temporal and spatial proximity influence the opportunities to share knowledge (Keating, Ayanian, Cleary, & Marsden, 2007). Hasgall and Shoham (2008) claim that hierarchical organisations do not enhance effective use of personal knowledge. Furthermore, lack of time can hinder knowledge sharing (Riege, 2005).

Regarding the social context, it is also important to acknowledge that organisations are not homogenous cultures. There can exist several subcultures, which all have their own norms and practices (Ipe, 2003). In these subcultures, different professions and their jurisdictions can inhibit knowledge sharing (Currie, Finn, & Martin, 2007). Keating et al. (2007) perceived that primary health care physicians rely often on colleagues for new information and advice about the care of their patients. Physical proximity, for example working in the same clinic affects knowledge sharing and physicians seek out those colleagues who have the most experience and are likely to give the needed information. Fattore, Frosini, Salvatore and Tozzi (2009) claim that social influence creates similar behaviours among doctors.

2.3 The research objective

The current research on service practices emphasize that value is co-created (or destructed) by socially embedded actors. It is understood that these actors integrate resources, particularly knowledge and skills, for the benefit of themselves and others. This assumes that knowledge and information flows freely from an actor to another, and that the

integration of knowledge resources benefits the actor. Nevertheless, studies on value co-destruction indicate that value is not always co-created in these processes. Thus, the focus shifts toward the prevailing structures that hinder information and knowledge processes.

We are particularly interested in the information and knowledge processes in public health care, and in the involvement of patients and their families in these processes. We take a closer look at the phenomenon through a research setting in multiprofessional Integrated Care Pathways (ICPs) of childhood obesity in Finnish public health care. The main research question is formulated as follows: How do the information and knowledge processes in the ICP obstruct the value co-creation by the patients and the health care organisations?

3 Research design

The qualitative case study involves the Integrated Care Pathways (ICPs) of two Finnish University Hospital districts. An ICP is a practise between primary health care and special health care. An ICP ensures the use of available resources in primary health care and specialised care as efficiently as possible.

The empirical data, collected between 2009 and 2012, consists of semi-structured interviews of 30 health professionals in primary and special health care, and of three children and their mothers, a family questionnaire (N=13), health care organization's care path instructions and memos of an ICP work group. The choice of method is validated by (Hardyman et al., 2014) who note that value co-creation in the health care contexts requires more ethnographic touch and a range of methods (i.e., observation, interviews, and documentary analysis) to understand how value is created by patients and the health care professionals.

The interviews of the health care professionals of both embedded units of analysis and the interviews of the patients and their families were digitally recorded and transcribed verbatim by the researcher. The interview quotations were translated from Finnish by the researcher. The quotations were marked with letters and numbers. The code UA1 refers to the first unit of analysis and UA2 to the second unit. Letters Sp refer to health care professionals in special health care, letters Pr to health care professionals in primary health care, and letter M to the mothers of the patients and Ch for the children.

To protect the anonymity of the interviewees in health care their professions are not mentioned although this information would be interesting. Since there are only one or two actors in each professional group full anonymity could not be guaranteed if the professions are mentioned in the quotations. Quotations from the open-ended questions in the family questionnaire in UA2 are marked with letter F and a number.

The analysis of the embedded units was performed separately at first and then the findings of the two units were combined. The findings of the embedded units of analysis were combined because they proved to be similar for the most part, as presupposed. The similarities are due the firm regulation of Finnish health care and moreover, the care practises in both university hospital districts are based on national Current Care (Käypä hoito) guidelines. However, analysing the embedded units of analysis separately allows comparison of the possibly emerging differences in the two units.

In addition to the interviews, the document material: the care path instructions of the four municipalities' health care centres, the care path protocol of the second university hospital, the document of the regional care pathway for obese children in the first university hospital, and the memos and agendas of the first unit of analysis ICP's work group meetings between 2009 and 2012 were content analysed. The themes which emerged in the documents were categorized and counted. Due to the nature of the survey including its size (N=13), the data were analysed quantitatively only through standard deviations. The data of the open-ended questions were analysed through content analysis.

The research was conducted according to the Finnish law and decree of medical research. The World Medical Association Declaration of Helsinki (WMA, 2009) requires that subjects are protected from any discomfort and harm that may be psychological, emotional or economic. This research involved a minimal risk for the subjects that participated in the interviews. The findings are presented so that they cannot be used against the children's, parents' or health professionals' interests. Ethical rules of scientific research were followed by ensuring that the data and analysis were accurate and the findings were presented honestly.

4 Empirical findings

4.1 Interaction between health care professionals, the patients and their families

In our study, we find out that parents are not ready to actively participate in practices that would be required for positive health outcomes for their children. In brief, parents are unmotivated and incapable to undertake required lifestyle changes. According to our study, parents have enough information to understand that lifestyle changes are needed. However, the changes require efforts and resources which are a challenge for the families. In other words, the problem is not the amount of information but that the type of information and knowledge that is provided to the patients and their families. The information is not able to motivate or to empower the parents enough.

Lifestyle changes require determination and motivation. The patient and family interviews in UA1 indicated that the most important motivating factor for weight management was health in a lifelong perspective: "It is of course that you

do not get any diseases at older age”(UA1M1). Physical and mental welfare were also important issues: “The child should feel good now and in adulthood both physically and mentally and have good self-esteem” (UA1M3).

From the families’ point of view, information value is related with their conceptions about the health risks of childhood obesity. This, in turn, is related with their motivation to change lifestyle towards healthier nutrition and to more active living habits. If the family does not recognise the child’s obesity as a problem which should be treated, they can find health information patronising and irritating. From the perspective of health care professionals, the main challenges for lifestyle counselling appeared to be firstly the sensitive nature of obesity and overweight and secondly the children’s and families’ lack of motivation to make lifestyle changes in order to lose or to manage weight.

About one-third of the interviewed health professionals thought that health and prevention of diseases are not motivating factors for children or for their families. “Of course there are some children and families which are not at all motivated. They find it difficult to come here, they are not interested, and we shift those patients away.”(UA1Sp3). Health care professionals simply consider that knowledge and information is not the problem but lack of motivation. “I know that they do know. It is not about that. It is about how they can realise it. There should be some other way. I do not believe that our way is so good. I do not believe”(UA1Pr5). One family’s answer in the UA2 patient survey is in accordance with the health care professionals’ opinion: “It is not about lack of knowledge. We parents have gone to many weight management courses. Everyday life is sometimes rough and when you are tired weight management does not succeed.”(F1). As families perceive receiving enough information from primary and secondary health care, they do not search for additional information sources. “...quite many people say that yes, I have got knowledge, I know what should be done. But how do I realise it?” (UA2Pr8).

Thus, our research indicates that the information and knowledge given could be of wrong type for these families. For instance, families expect practical tips how to solve some of the challenges that lifestyle changes bring to the family. For instance, in one family parents aim that the obese child would not feel somehow different than the other children in the family. Restricting one child’s portion sizes and denying extra portions is a challenge in a big family.

In general, the patient and family interviews in UA1 indicated that lifestyle changes are not easy although the families find the counselling good. “I am sure that the adolescents and parents know in theory what should be made and they have heard all these lifestyle and nutrition instructions many times but they are so frustrated with that repetition and they do not have a trick how to do it.”(UA1Sp2).

The findings of the interviews in UA1 and of the family survey in UA2 indicate that every family has its own challenges in weight management. For some families the challenges are with changes in nutrition: “...he does not like all foods. Some salads and root vegetables—he does not want to eat them. So that we have not been able to realise all the instructions because I cannot get him to eat them.” (UA1M1). Nine families reported that increasing fruits and vegetables into the diet and avoidance of sweet or salty treats was a challenge for them. The portion sizes were a problem for eight families but the frequency of meals did not seem to cause so many difficulties. Four of the thirteen families found it difficult to restrict portion sizes, especially when the child complains of hunger after the meal.

For other families adding exercise to everyday life was difficult: “It depends on [child’s name] also, I cannot make him exercise by force.” (UA1M2). Seven families could not find time to exercise. Two families answered: “to combine the long school days and exercise”(F2), and “the school days with the traveling lasts from 7a.m. to 4 p.m. Then there is no energy left”(F12). Eight families found it difficult to restrict the child’s or adolescent’s television or computer time. As a result, the families would like to have more practical advice, support and encouragement. Club activities for children and family exercise were also wished for. On the other hand, the parents did not seem eager to discuss issues about weight problems either face-to-face or online with other similar families. Perhaps the families do not want to be labelled as “families with obese children” by joining discussion boards or clubs with peers.

Health care professionals thought that the most prominent costs or sacrifices of lifestyle changes for the families are to carry responsibility for the child’s eating: “With these weight issues it is mainly about setting boundaries for the child and if this is a problem it is a big challenge for the parents” (UA1Pr4). The question remains whether this is an issue of being incapable of setting boundaries or denying the problem. Of course, setting boundaries may be challenging when there is lack of motivation on the child’s part. One parent describes the challenging situation at home as follows: “The child has a difficult and rough puberty. Lack of social relationships led to the computer and to game addiction. When the mother remarked about the eating habits it led to resistance. The child eats the treats, snacks, and chips in secrecy and the wrappers are found here and there. (F7).

It is also common that the family denies the problem. The issues of overweight and obesity raise strong emotions which can appear as the child’s or parents’ resistance, denial or even anger towards the health care professionals. Especially if the parents also have weight problems it can be difficult to bring up the issues of weight management because the parent can find this insulting: “For some families it is a sensitive issue, especially if they all have overweight. They do not necessarily want - some can even refuse. They do not want to discuss these issues so that the child can hear them, they do not want to bring them up.”(UA1Pr4). All 18 primary health nurses and doctors reported that they had sometimes encountered resistance and denial from parents when interfering with the child’s overweight. Some families apparently perceive lifestyle and eating habits as private and personal issues so they want to maintain their boundaries: “For example I have seen such situations that the parent has called saying this letter has hurt him/her or that the letter stigmatises children even if that is not the purpose. I cannot know what kind of dynamics there are in the family and why it is like that. So parents do not understand why we interfere.”(UA2Pr2).

If the family does not find that the child is overweight or obese, lifestyle guidance is not perceived relevant for them. "I think that it often arouses negative feelings and that the parents do not even necessarily understand that the child is obese; they think that the child is quite normal. And when the public health nurse interferes, well, I have a feeling that it is not so pleasant." (UA1Sp1). Denial may be even more common when the whole family suffers from obesity: "There are of course those people who say that we eat like this and we do not want to make any changes." (UA1Pr2) As parents deny the problem the health care professionals feel powerless. "Many parents do not react at all. The child can be very chubby and my follow-up are as good as nothing because I only talk with the child and I cannot reach the parents." (UA2Pr2). In addition, the problem may not be only limited to the parents but wider social context that may resist lifestyle changes: "...a grandparent can live nearby and older people have different perceptions about healthy children and how they should look. A chubby child is a healthy child..." (UA1Sp2). The child's life is affected by so many people that if they do not think in the same way, the situation can be very challenging.

Although the families say that health and well-being is a value and motivating factor for them, this does not show in the results of weight loss or weight management. In other words, health professionals do not think that health and facts of risks of obesity are valuable information for the families. "Definitely I think that the child or adolescent is not worried if we say that when you are in your fifties you have arthritis or when you are forty you can get type 2 diabetes. It is unimportant for them when they are so young." (UA1Sp2). The associated health problems seem too distant for children or adolescents. In these cases it can be assumed that the information value of the families' differs from the information value of health care professionals. Therefore, it is worth taking a look at the structures in health care that influence the information provided by the health care professionals.

4.2 Structures in health care influencing information and knowledge processes

Counselling is perceived as the mean to help patients to achieve the goals of health and well-being. Particularly, in the context of childhood obesity the counselling should focus on enabling lifestyle changes. However, our study identifies barriers for effective service provision. As a result, health care professionals tend to focus on medical issues rather than lifestyle counselling. This stems also from other underlying structures which are problematic for knowledge and information sharing and other information and knowledge processes. We identify the important boundary between primary and special health care, between the municipalities, between permanent and temporary workforce, and between different professional groups.

Firstly, a clear boundary between primary and special health care can be identified in the interviews of the health professionals. Thus, primary healthcare and special health care are two separate institutions. From the primary health care's perspective, special health care is an unknown entity; the practises and actions are not familiar to primary health care professionals: "We have made a referral to special health care very seldom, but when we have done so I have a feeling that we do not get any feedback. Somehow it is a bit ambiguous, the patients disappear somewhere..." (UA1Pr3). In special health care the referrals from primary health care are the principle sources of patient information alongside laboratory results and growth charts. In general, the contents of the referrals vary. It is not always clear, what kind of care is needed in special health care: "In some cases it remains an open question that when the referral arrives, you do not exactly know what it is about" (UA1Sp3).

The health care professionals do not often know the actors and the practises in other organisations. This was evident in both units of analysis: "I always think what the content of those appointments is. Is it so that the child goes there for weighing or are some public health nurses able to take the parents? I don't know." (UA2Sp1). In special health care many professionals were concerned about possible contradictions or overlap in counselling because they did not know what kind of information the child and the family have already received in primary health care and from other personnel in special health care. "I have thought that it would be interesting to know what different professionals have said to a patient. We have this care protocol as a document but does it come true like that? Are there some gaps regarding some family, which nobody has mentioned? Or are there overlapping issues and do they confirm the message or are they frustrating? How much contradictory information do we provide?" (UA2Sp2)

Secondly, each municipal health care centre which belongs to the regional ICP is a separate actor in the ecosystem. The practises and actions even of the neighbourhood municipality are not always familiar in other health care centres although some collaboration can take place: "In [name of the municipality] they have their own system but I do not know how well it works" (UA2Pr2). In patient care, health care professionals must be familiar with the previous medical history of the patient and also be aware of the family's medical history in order to evaluate risks and hereditary tendencies for medical problems. However, the EPRs of neighbourhood municipalities' health care centres do not communicate with each other, which does not enhance collaboration. For example, one health centre in UA2 recently became part of a larger community which provides social and health services for four municipalities' inhabitants and technological problems cause difficulties in collaboration: "...we are in the same organisation as [municipality's name], [municipality's name] and [municipality's name] and it just came up in a meeting that [municipality's name] and [municipality's name] do not have access to the intranet where we have information for every employee and forms and everything else that we need in our work." (UA2Pr5).

Moreover, the patient documents must be requested from the other organisation with the permission of the patient. The boundary between health centres is thus actually structural due to different EPRs. Furthermore, the practise of transferring patient documents is defined by the law (MSAH 1994): "We get the papers of the child welfare clinic quite

well, but we do not get any other papers. We also do not have permission to send the epicrisis of the [name of the hospital] forward.”(UA1Pr2).

Thirdly, long work relationships establish collaboration and trust and the network ties become stronger. Colleagues and co-workers are perceived as insiders: “We have good telephone connections. We know each other and it is easy to call a colleague and to talk about work issues” (UA2Pr9). Trust in these relationships is based both on affective and cognitive aspects. For example the public health nurses who have been working with the same doctor in the child welfare clinic or at a school form an “insider” dyad: “In this other school we have had the same doctor for years and with him collaboration goes well since we have known each other for a long time” (UA1Pr4). Cognitive trust in these dyads is based on the health care norm to respect co-workers’ competencies and also on the dominance of medical knowledge and the knowing of doctors. Collaboration and communication with a familiar co-worker is easy and builds up affective trust. However, the doctors in training remain as outsiders. This is partly due to the practises in university hospitals where doctors in training change after their fairly short (from three to six months) training period and they do not have time to internalise the practises and norms of the institution. “And the specialising doctor is always the weakest link, because he/she is new and this work differs from other medical work.” (UA2Sp2).

Constantly changing work partners hinder true collaboration and trust. There is not enough time to build up trust and to learn to collaborate. This seemed to be a problem especially in primary health care because understaffing had led to changing substitute personnel. “Formerly when we had a regular doctor at the secondary school, it felt that it was so much easier to work with a person you were used to working with and whom you were able to trust. But now, we have these visitors. During that time when I worked at the other secondary school there were at least ten different doctors. Continuity in the collaboration between the public health nurse and the doctor would be so important.”(UA1Pr3). Attitudes towards newcomers and their knowing came up in the interviews of more experienced health professionals. “It can well be that someone has been let’s say six months working here and then suddenly realises that we have these weight path instructions.”(UA2Pr4).

Fourthly, the norms also seem to keep up the boundaries between different professional groups. Sharing of information, knowledge and knowing is more common within one’s own professional group. This may be due to common language and use of terms and similar education, and thus also a similar basis of knowing and competence. Thus, sharing of knowledge and information seems to be not only more common but easier within one’s own professional groups. In some cases there are clear boundaries even in the same health centre: “Maybe it is that the child health clinic functions as the child health clinic and the doctors work as doctors and the nurses work as nurses. We have only two floors here in between us but sometimes I have a feeling that information transfer does not function well.”(UA2Pr6).

For example, in both university hospitals the special health care doctors attended the doctors’ meetings regularly but the weight clinic team meetings in the UA2 hospital were not so significant for them. “I myself think that the meeting on Wednesday mornings concentrates on the medical aspects because the doctors are there—we do not talk about such things as does the child get enough exercise—we focus on the medical problems such as high blood sugar levels and how to handle those problems. It is for me a meeting where I can see the medical aspects and the meeting in the afternoon is more of nursing.”(UA2Sp). In addition, the doctor-focused information sharing causes problems with the epicrisis or care feedbacks from special health care to primary health care, as the message about the electronic epicrisis goes to the doctor who has written the referral. All the public health nurses mentioned this as a concern. “The epicrisis comes from the doctor and it is available in [name of the EPR system]. But if you have not written the referral yourself, you cannot keep up when the epicrisis from special health care arrives. If I am not active myself, I do not see the epicrisis.”(UA1Pr3).

The implications of the social structures can be identified in the focus on biomedical knowledge. The prevalence of biomedicine reflects in the attitudes of health care professionals. This, in turn, appears in lifestyle counselling which has so far been very factual and clinical: “It is more or less talking about facts: what it is about...” (UA1Sp2). However, one professional recognises this as a problem — obesity is a multifaceted and complicated problem and the treatment is not simple: “Maybe it was all over Finland and maybe even worldwide that the approach to obesity treatment was factual. Health care professionals must give the families instructions and some advice, but it is not at all like that.”(UA2Sp2). Childhood obesity is also a sensitive issue for many families. The parents may feel guilt or shame and these emotional aspects should be taken into account in counselling.

The dominance of biomedical knowledge is visible in the doctors’ role as decision-makers both in primary and in special health care. For example, the main tie between primary and special health care is managed by the doctors through the referral-epicrisis system. “For example, only a qualified doctor is allowed to diagnose a disease. Care decisions should be based upon diagnosis. In this work I handle the referrals and I take a look at these patients. I think that the most important thing is to make differential diagnosis, to pick those patients who clearly have a disease and those who have risks for complications such as disturbances in sugar metabolism or in fat metabolism or have high blood pressure and other things.” (UA2Sp).

In special health care the role of the doctors seems to be more dominating than in primary health care. In primary health care the public health nurses work very independently in the prevention of childhood obesity and they consult the doctor only when needed. The primary care doctor decides if some further medical examinations or procedures are needed. However, for the families the doctor’s opinion can be more significant than the public health nurse’s intervention: “The school doctor is there then when the child is really overweight. The idea is that the doctor is there to

give some authority and to influence the families to do some changes”(UA2Pr7). The focus on biomedical information and minimum lifestyle counselling is an easy but inadequate solution to the complex problem. “To provide information is easy, but how to motivate people and how to support the motivation, that is the real challenge.”(UA1Sp3). Division of work tasks and responsibilities is at the same time a social norm, a practise, and an issue which is strictly ruled by the laws (MSAH 1994). The individual care path instructions are parallel to the national Current Care guidelines. Division of work tasks of different professional groups can be perceived as a norm: “The public health nurses play a key role here. They meet the families and children and adolescents and ask them for follow-up visits and give guidance and that is actually all you can do”(UA2Pr4).

Health care professionals follow care path instructions that contain elements of medical knowledge about the subject matter, organisational routines and practises, and about the justification of health care to interfere with the problem. All the instructions contain recommendations of weight (and growth) controls for follow-ups and they define what laboratory tests should be taken for the purposes of health risk evaluation and differential diagnosis. Furthermore, the care path instructions take a stand on the issues which should be brought up in counselling. In all the instructions these are rhythm of everyday life and meals, exercise habits, constitution of the diet, snacks, and drinks. However, there are not detailed instructions about the content of counselling.

Different professionals meet the patient mostly separately and thus every professional hears a slightly different patient narrative and constructs the conception of the patient and his/her problem from their own professional point of view. These different conceptions may even lead to conflicts in collaborative care. “Sometimes when I read the doctor’s texts I think how he has been able to make the status and ask for the anamnesis of the family and to give instructions in twenty minutes. The child has been severely obese for ten years and the instructions are that ‘daily exercise is recommended and eating of treats should be minimised’. Yes, that is the solution!” (UA2Sp2)

The most important factor which hinders interpersonal communication during the work day is lack of time and lacking opportunities to meet colleagues and coworkers due to busy schedules in both primary and special health care. Personal interaction requires time from all the participants. Furthermore, structure of the social network, physical distance and lacking opportunities to meet colleagues and co-workers make sharing of knowledge and knowing challenging. Lack of time also influences the quality of entries in EPRs. The notes must be accurate and careful recording can take a long time: “Yes, it takes time. Of course we public health nurses have personalities so that one can write very accurately her texts and the other less” (UA2Pr12). Even in hasty situations the entries have to be made: “We try quickly to write into the care plan what we have been talking about” (UA1Sp4). Moreover, reading the previous texts requires time: “I think that it has enabled better transfer of information, if you only have got time to open the files and read them”(UA2Pr5).

For health care professionals negative weight management results cause frustration and lead toward idea that childhood obesity is not even worth investing time. “...in my experience obesity treatment is extremely frustrating...I do not know what could help in it. I am quite desperate about it...Of course, you can try and it is worth to try...”(UA1Sp2). In the end, it should be remembered that it is not only about the practices in health care that cause frustration. “Maybe it is more about parental attitudes. I do not know. Somehow I feel that they do not want to do anything about it, they do not want a change. Because in order to make changes they should completely change their lifestyle and they are not ready to do it.”(UA2Pr4).

Above, we have identified several practices in health care, and discussed how these influence the information and knowledge processes as well as focus on biomedical medicine. This results in counselling that is not supporting the value co-creation of the families of obese children.

5 Conclusions

Knowledge and skills are required for value co-creation. In healthcare environment, knowledge is integrated by patients and their families to improve the wellbeing of the patient. In some situations the role of patients own activities are crucial, particularly in lifestyle related preventive healthcare. But surprisingly, we often witness cases where a patient is reluctant to participate in the coproduction process, as healthcare service is something he needs but not necessarily wants (Berry & Bendapudi, 2007). In the long run, this can be value destructive not only for the patient but to the society. In this study, we find that the issue is not that there would not be enough information available but organizational practices and information and knowledge processes may guide toward provision of wrong type of information. We found both families that deny the problem of childhood obesity and families that admit the problem but expect more practical advice, support and encouragement from the public health care. The problems stem from the information and knowledge processes and structures which are deeply embedded in the health care system.

Our study reveals that the health care professionals do not often know what is required by the patient families or how to deliver information that would be useful for them. Although ICPs have been designed to standardize the role of each actor in the pathway, the knowledge is not flowing smoothly to benefit the patient. As a result, the childhood obesity treatment is in danger of not supporting lifestyle changes in the families of obese children. In the study, we identify the barriers in information and knowledge processes that lead to these challenges, namely focus on biomedical knowledge, norms of following instructions, and lack of time and resources to act differently. As a result, we make explicit the problems behind the childhood obesity care that leaves families unmotivated and incapable of undertaking

necessary life style changes. Wrong type of counselling is wasting scarce resources in a society, and therefore the service provider's activities should support the required lifestyle changes.

Theoretically, we contribute to TSR literature by highlighting that agency and interaction in transformative service may also have negative effect on well-being of actors (Anderson et al., 2013). Instead of limiting the study to individual patients, this study extends the view to the requested collective level of consumer entities, or 'third parties' (Anderson et al., 2013; Hardyman et al., 2014), i.e., families of child patients and their social contexts. Furthermore, whereas the study by (McColl-Kennedy et al., 2012) focused on customer value co-creation practices, we extend the view to the practices of service providers (Rosenbaum et al., 2011), i.e., institutions and norms surrounding the healthcare professionals. As a result, this study contributes to the TSR literature by answering to the call to identify potential barriers for value co-creation in health care (Hardyman et al., 2014).

We are limited in having a look at traditional health care system. Hardyman et al.,(2014) highlights the role of service interaction to understand patient engagement. These interactions are not limited to the face-to-face-meetings with general practitioners but are extended to pre-consultation phase and encounters with friends, family members and even online forums. Recently, Loane, Webster and D'Alessandro (2014) discussed the role of virtual health communities in value co-creation in greater detail. They built on the exchange of social support, as the mechanisms for providing opportunities to create and experience value. They emphasized that value co-creation in health care covers more than traditional medical solutions. By changing the focus from patients to families, we contribute to better understanding of the role of social context in value co-creation (and co-destruction) in transformative service research. However, the data from families is limited and further research is called for understanding transformative service practices in the patient's family.

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Constructing user understanding for technological innovation in service and manufacturing companies: expert insights

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It has been widely acknowledged, that the user knowledge is important source of innovation. However the practices and challenges of user knowledge management in service and manufacturing companies have not been studied sufficiently. This study is based on a qualitative empirical inquiry among 14 experts representing 8 services and 6 manufacturing organizations in Switzerland, Germany and Finland. The findings highlight that while knowledge from the actual use context is crucial in all parts of an innovation process, the key challenges making use of customer knowledge include that the user knowledge is collected by persons that are not involved in the innovation project teams.

1 Introduction

Through user knowledge companies can obtain new ideas and respond to changes in the market more rapidly compared with in-house innovation (Rajala et al., 2013). Yet, making use of user knowledge is considered to be challenging (Bogers et al., 2010), as the knowledge held by users is often tacit by nature and difficult to share (Bonner, 2010). In manufacturing companies operating in business-to-business (b-to-b) context, users have hardly been considered the center of attention in an innovation process (Roto et al., 2013) – the companies have been either product-centric or customer-centric (Galbraith, 2002). On the contrary in service companies operating in business-to-consumer (b-to-c) context is the user, which is most often the consumer, has naturally been the center of attention.

Today, many of the manufacturing companies have added some services to their offering portfolio due to the globalization and low margins on products (Kinnunen & Turunen, 2012). This phenomenon is called as servitization. Although there are challenges in servitization, it brings opportunities with it too. One of them is the grown ability to gain user knowledge. This is because the service process includes always the user (Edvardsson & Olsson, 1996). Traditional manufacturing companies are considered to have a product-oriented culture (Bowen et al., 1989). Services are seen as “add-ons” or as unprofitable necessities to sell products (Oliva & Kallenberg, 2003). To overcome this, Grönroos (2008) has argued, that companies should not concentrate to their offering but rather on their customers and users among others. Even though, research on how to methodically integrate the customer and user understanding in service development process is scarce (Edvardsson et al., 2012).

The participation of organizations has been increasing for a long period, but the decisions about major innovations have resisted increased participation. There is still a small group of individuals within the organization that have the privilege to make the decision, also about the user knowledge. Employee-driven innovation (EDI) refers to the generation and implementation of significant new ideas, products, and processes originating from a single employee or the joint efforts of two or more employees who are not assigned to this task (Kesling & Ulhøi, 2010). Front-line employees are potential interpreters of user needs (Hasu, Saari & Mattelmäki, 2012) and thus may be a valuable source of user knowledge.

In this paper my aim is to identify user knowledge practices that are used to construct user understanding for technological innovation in IT-driven service companies and in manufacturing companies. I also aim to identify user knowledge practices that support or may benefit from EDI activity in organizations. This paper is organized as follows. First, the theoretical background of the study is established by reviewing the literature on user knowledge management and its linkage to employee-driven innovation. Then, research design, case selection, and data collection is described. Thereafter, the findings from the expert interviews are reported. Finally, I explain my contributions to the theory and practice of user knowledge management for effective user-focusing innovation.

2 Theoretical background

Previous studies have defined users as firms or individual consumers that expect to benefit from using a product or a service (e.g. von Hippel, 2005). In business-to-business (b-to-b) environment, the concept of “user” is considered more complex compared with b-to-c markets. Particularly in industrial business, users are often organizational actors. They may not be the same individuals and even not necessarily in the same organization as the vendors’ primary customers. Also, there is swapping of information between users about vendor products and implementation experiences (Fincham et al., 1994). This can make user knowledge a property of the users’ organization or community.

2.1 User knowledge management for technological innovation

Research on how to methodically integrate the customer and user understanding in service development process is scarce (Edvardsson et al., 2012). Although users are seen as important part of innovation process, previous studies have

not paid sufficient attention to the types of customer and user involvement in different innovation process activities (Coviello; Joseph, 2012). The changing role of users has been investigated and some reasons why users would help facilitate the development and further diffusion of the vendors' offerings have been suggested by Pollock and Hyysalo (2014). The reasons include that users' may want to ensure continued take-up of vendor products and that specific needs can be catered for within and between domain competition. It has been argued that firms need a special competence on the organizational level to systematically integrate customers and users into the innovation process (Lettl, 2007). Moreover the intensity of customer and user interaction varies for different stages of the innovation process (Gruner; Homburg, 2000). And at the same time, companies that have invested in open innovation activities have faced risks and barriers that hinder them from profiting from their open innovation initiatives (Enkel et al., 2009).

Edvardsson et al. (2012) point out that in order to integrate users' context-specific knowledge and situational experiences in the innovation process, there should be interaction between the innovators and the users throughout the different phases of the innovation process. To address this need, Edvardsson et al. (ibid.) propose a framework for customer integration connecting situational information on the use context though the methods of service development. In order to support the innovation process, innovators need efficient cross-functional collaboration (e.g. De Luca et al., 2010) and interaction among integrated business departments (Schindlholzer et al., 2011) to have the relevant knowledge when and where it is needed.

There are several innovation methods that highlight the need of user knowledge. One of them is design thinking, which is a set of practices for creating innovations. Innovation by design thinking is meeting people's needs and desires in a technologically feasible and strategically viable way (Brown, 2008). The design thinking also brings together the innovation team and the user.

2.2 Utilizing user-knowledge management to foster employee-driven innovation and vice versa

The core assumption on employee-driven innovation (later: EDI) is that, in traditional organizations, ordinary employees tend to be permanently excluded from decisions made about innovations (Kesting; Ulhoi, 2010). In this research field, organizational members that have been assigned formal authority to make decisions about innovations are called managers and those who have not been assigned are called employees. One of the core information that the managers need, to be able to make good decisions on innovation, is the knowledge of users. This knowledge is not easy to acquire and it takes time and requires analytical skills to interpret and understand the information (Kesting; Ulhoi, 2010).

Employee-driven innovation research suggests that radical innovations are not user driven, but employee-driven. Users just need to adopt and buy those innovations. This viewpoint has also been argued in the marketing literature (e.g. Atuahene-Gima, 1996; Im; Workman, 2004; Renko; Carsrud; Brännback, 2004), although opposite arguments has also been presented. Especially in high-technology companies, a market orientation needs no to be added to R&D in the innovation process, but it needs to blend with it (De Luca et al., 2010).

The concept of "practice" refers to a type of activity that consists of several elements: bodily movement, mental activities, objects and their use, contextual understanding, normative understanding and emotion (Reckwitz, 2002). In everyday practices, learning takes place in the flow of experience, with or without our awareness of it (Gherardi, 2000). In innovation context practice would refer to the shared understanding of corporate life (in this case: understanding of customer and user knowledge) and the "corporate kind of creativity" and praxis would include ways of presenting, commenting, refining and evaluating ideas (in this case: knowledge about customers and users) (Lempiälä, 2011). One suggestion would be that the front-line employees are taken to be part of the innovation process more tightly to bring the user knowledge with them.

As presented in previous chapter, the user knowledge is most often intangible. It is hold in the heads of key account managers (or similar), maintenance persons, customer support service persons and other organizational members working with the users. It is rarely the innovation managers how knows the users well (Kanto et al., 2014), but it is the front-line employees that are potential interpreters of user needs (Hasu et al., 2012) and thus may be a valuable source of user knowledge in decision making process.

3 Research design

The research was conducted as a qualitative explorative study. The research followed an abductive process (Dubois and Gadde, 2002), combining theoretical knowledge and empirical insight systematically. Thus, the research process comprised both inductive and deductive phases. The inductive case study approach makes it possible to gain novel insight from the empirical world (Yin, 1994). This methodological approach analyses the empirical data gathered from the cases in light of the existing theoretical explanations, extending them if necessary. The researchers examine the literature relevant to the problem area, and employ the empirical data, filling in its gaps and revealing its flaws. In this vein, the research elaborates the meaning and extends the coverage of the prevailing theories.

The data of this study consists of 14 in-depth expert interviews. All the experts presented the senior management level in their organizations. Six (6) experts in Finland, Switzerland and Germany were interviewed in six different well-established industrial manufacturing companies operating in b-to-b environment. Similarly eight (8) experts in

Switzerland and Germany were interviewed in eight different well-established IT-driven service companies operating both b-to b and in b-to-c environment. The list of interviewees is presented in Table 1.

The semi-structured interviews lasted on average one hour, and were arranged during January-March 2014. All interviews were recorded, transcribed and coded by exploring the commonalities and differences.

Table 1. List of interviewees.

Service companies, both b-to-b and b-to-c			
	Position	Department	Industrial sector
1	Senior manager	Design	Banking
2	Senior manager	Design	Telecommunication
3	Senior manager	IT	Software
4	Senior manager	IT	Banking
5	Director	IT	Banking
6	Director	IT	Insurance
7	Senior manager	IT	Banking
8	Senior manager	Sales&Marketing	Banking
Manufacturing companies, b-to-b			
	Position	Department	Industrial sector
9	Director	IT	Chemicals
10	Senior Manager	Development	Metals
11	Director	Marketing & Sales	Pharmaceuticals
12	Manager	Desing	Marine
13	Manager	R&D	Chemicals
14	Director	R&D	Pulp and paper

4 Findings

As described above, the experts that were interviewed are members of companies operating both in traditional industrial sectors and also in IT-driven service sector. The companies operating in traditional manufacturing companies were facing the paradigm shift of offering – from purely manufacturing centric to more service oriented company. Even though the interviewees considered their companies still very much as manufacturing centric organizations: “I was wondering if we have any service, just service. I suppose all of our services are tied to the products” (Expert number 9) and “Think in the past our company has been very much product- or technology-driven... and we learned that this is not the approach for the future. We are now trying to change to be more human-centered.” (Expert number 13)

The findings from the expert interviews were similar in every country, but differences were found between manufacturing and service companies. The main findings are listed in table 2.

4.1 User knowledge practices

There is a difference between service and manufacturing companies in the utilization of user knowledge. The user knowledge that is utilized, in the innovation process of manufacturing companies, is the knowledge from the problem cases, user wishes in some extend and market trends. The user knowledge is quite narrow, because for manufacturing companies it is easier to talk with the customers than it is with the users: “Our product is more like a raw material, so it’s hard to discuss with the user” (Expert number 14). The service companies have more varieties in the sources of user knowledge. Most of them user either friends & family testing, special interest groups or extreme users: “We have a special interest group... we invite these people three to four times a year and ask how they use the services, what they need and so on” (Expert number 7).

There is a shift of attitude and culture going on in manufacturing companies: “We call it a client innovation center where we bring our lab expert and our key account managers together. And they go together to meet to users, arrange workshops whatever. This center started in half a year ago” (Expert number 13). Half of the experts working for service companies described a similar kind of “attitude change” which happened already 5-6 years ago: “We change our organizational set up from a technology-centric approach to a more human-centered approach in 2008.” (Expert number 2) and “We started this [design thinking] approach with heavy user-involvement in 2009” (Expert number 1).

The experts described several practices that were used in their organizations to collect user knowledge: “We need to talk with people along the whole consumption chain. Not only the value chain of the manufacturing.” (Expert number 13) and “We have set up a customer interface -programme, because we want to have an ultimate experience for every contact between our company and customer... And the customer is almost always the user” (Expert number 4). However the way the users are met in service companies has more varieties than in manufacturing companies: “We encourage the team to connect with the users... Go to have lunch with them, watch them, talk to them... doing that, they get the chance to create emotional bond with the user...” (Expert number 1) and “Prototyping is very important. It’s much easier to understand what the service is going to be like, if you have something that you can try” (Expert number 7). In addition the service companies use storytelling, ethnographic research and living labs: “We have set up a testing laboratory to which we can invite our clients [=users] to test our new offering” (Expert number 7). The company, in which the expert number 14 works, has also done experiments with the 3D-printing methodology and has found it a potential way to make intangible matters to tangible ones.

4.2 User knowledge practices that support or may benefit from EDI activity in organizations

The common problem noticed by each expert is the fact that only the sales persons meet usually the customer (which may or may not be the user) in a meeting room or in conferences. However there is also willingness in sales support and design to contact the users directly. At the moment this activity is not supported by top management, although every visit at user or customer site has been valuable for the sales support and design managers & specialists: “The visits were useful. I got to know what they expect from our products and also got to see how big their facilities are” (Expert number 12). There were also individuals in the case company that had started to change the practices by their own:

“I have been travelling around [the customer sites] and I have took the younger colleagues with me... there is a lot of knowledge which is not written any were, and you can better understand the meaning from gestures than from written words” (Expert number 12).

The personal meetings with user and development team members are important, because only that way the employees are able to create a emotional bond with the users: “One of the major shifts was to really make sure that a product manager gets in contact with the real customers... this kind of empathy is the key to corporate customers as well” (Expert number 2). And these personal meetings are important also, because the intangible nature of user knowledge: “Unfortunately in most ways it [user knowledge] stays with people... it’s very difficult to really transfer this kind of knowledge” (Expert number 2).

A challenge in this user approach, mentioned by almost each expert is that the frontline employees needs to give space for innovation teams: “Key account managers need to be convinced that especially product managers need access to customer to really understand them and to be able to develop tailor-made products” (Expert number 2). Only expert number 14 told that also the employees in innovation teams can meet the users whenever needed. On the other hand the maintenance persons in the manufacturing companies meet the users in their work or at least in their work space: “The maintenance persons are our best contact to users. They get the best knowledge from the live situations.” But the maintenance persons are involved in innovation process only occasionally.

The traditional “Upstairs, Downstairs” separation of employees and managers is still clearly seen in each company, because the innovation board is an upper management level activity. However there is some good action coming also from the top management which may benefit the EDI activity, or at least the connection with users: “The head of the residential business was very much fond of this kind of approach [human-centered approach].” (Expert number 2) and “The [design thinking] approach came from the senior management. CEO pushed it a lot here and that helped enormously. It motivates managers to go for it” (Expert number 3). Moreover, expert number 7 told that they show their appreciation to the employees by not having suggestion boxes.

“No, we do not have suggestion boxes. It would be full every day and if someone brings in an idea, we should give him feedback about it... no time to give feedback for hundreds of employees... Instead, if you bring an idea for the innovation team, it is evaluated and most often... 7 out of 10 ideas get funding and also support for getting a team around the idea.” (Expert number 7)

Table 2. Main findings from the 14 interviews.

	Service companies	Manufacturing companies
User knowledge: sources	Friends&Family testing, special interest groups, extreme users, personal meetings, workshops, storytelling, ethnographic research, living labs, prototyping	Customer and user meetings, maintenance events, conferences (rarely), some workshops, only rarely some prototyping
User knowledge: who meets the user	Relationship managers, innovation managers (if possible)	Sales (second-hand information), Technical customer service, Customers' customer (if asked by R&D), Maintenance (if asked by R&D)
User knowledge: challenges	Relationship managers do not want to give access to meet client (=user), relationship managers are not heard through innovation process	Lack of user knowledge in general, lack of capability to utilize user knowledge, lack of cross-functional development teams

5 Conclusions

The paper contributes to the understanding of how user knowledge is collected in service and industrial organizations. The findings reveal the main challenges in making effective use of user knowledge in the studied settings. The user knowledge is found easy to use in business-to-consumer settings, but in business-to-business environment it is difficult to find the user of the offering. Different kind of user knowledge practices were found from service organizations, but there lack of user knowledge methods in manufacturing organizations

The findings are of primary interest to theory development and business practice, as the experts represent both service and industrial manufacturing companies operating in technology- and resource-intensive industries. The major challenges in the traditional in-house innovation experienced in the case organizations include that the individuals who are in charge of the innovation processes find it difficult to understand the meanings of user-related information and they cannot grasp the value of user knowledge. The findings suggest that taking the individuals to be part of the construction of user understanding it would benefit the company from the viewpoints of user-driven innovation and employee-driven innovation. Difficulties in accessing user knowledge may be overcome through increasing participation of front-line employees in innovation.

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Social and Individual Factors Influencing User Participation in Facebook-based Brand Communities

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A survey was taken of adolescents to understand the role of various social and individual factors in users' formulation of attitudes towards using commenting as a mode of participation in Facebook-based brand communities. Also, the relationship between a users' attitudes, continuation intentions, and activity levels are explored. The findings reveal that self-efficacy, hedonic motivation, reciprocal benefit, and social influence have a positive impact on the user's attitude. Among these, self-efficacy is found to have the strongest influence. On the other hand, external influence, social presence, and habit do not play any role in determining users' attitudes. Furthermore, attitude, continuation intention, and activity levels are significantly related. The findings have implications for organizations intending to use social network service-based brand communities to practice user-centric service innovation.

1 Introduction

Social networking services (SNS) have brought a change in the way humans communicate and keep in contact with their social circle. Most recently of all, SNS have also begun to exert their influence on the operations of organizations (Cvijikj; Michahelles, 2013; Muk; Chung, 2014). Some examples include: advertising about organizations' achievements, mission, and current tasks; practicing innovation processes; and involving and engaging customers. As the majority of people use some form of SNS, organizations are establishing their pages on various SNS to get easy access to their customers (Jung et al., 2014). These brand pages attract users who are either dedicated to specific brands, or are interested in the future offerings of the underlying brand. Brand communities in the network space can be defined as a "specialized, non-geographically bound community, and based on a structured set of social relations among admirers of a brand" (Muniz; O'Guinn, 2001). Hence, the established brand pages on SNS can be referred to as SNS-based brand communities. For example, on Facebook (FB), users can become members of FB-based brand communities by clicking the "Like" button on brand pages.

Organizations have recognized the importance of involving users in innovation processes (Buur; Matthews, 2008; Fuller et al., 2008, Von Hippel, 2005). In this context, relatively recent research has suggested that organizations are trying to establish closer bonds with their customers and involve them in the innovation processes by getting to know customers' opinions regarding existing and future services through SNS-based brand communities (Ding et al., 2014; Richter et al., 2011; Bolotaeva; Cata, 2010; Palmer; Koeing-Lewis, 2009; Park; Kim, 2014). The SNS-based brand communities empower customers by providing them up to date information about the company's new and existing offerings, connecting them with other existing and new customers, and most importantly, by giving them voice (e.g. enabling them to comment, express, or give feedback about a company's offerings). The participation of the user can be done at the following levels: (i) idea generation, (ii) evaluation of the potential of the new ideas while making decisions regarding future products and services, (iii) development of existing ideas with users and manufacturing, (iv) acquisition of feedback about the organization's existing products and services. Therefore, SNS-based brand communities are potential platforms to practice user-centric service innovation. However, user-centric innovation can only be practiced in SNS-based communities if their members are sufficiently engaged.

As the brand communities established on various social media platforms have experienced a rise in popularity, they have received less attention from researchers (Habibi et al., 2014). Enabling and retaining active user participation has been recognized as a potential challenge faced by SNS-based brand communities (Ding et al., 2014; Habibi et al., 2014; Deloitte, 2009). Based on research of about 400 companies, Deloitte's study (2009) reports that around 30% of companies are facing problems getting people engaged in SNS communities. At the same time, around 20% of organizations are facing issues retaining the existing members of their communities. About 35% of organizations have less than 100 fans (Deloitte study, 2009). Similarly, Sysomos's study (2009) of 600,000 FB pages also reports that only 23% of the pages have more than 1000 fans, while only 0.047% have more than 1 million fans.

In SNS-based brand communities, user participation can be affected by various factors. Some examples are: different SNS features enabling user participation, feedback from the brand and other members of the community, content type, number of members, and interaction patterns. To the best of our knowledge, the phenomenon of user participation in SNS-based brand communities via SNS-specific features has not yet been explored. Hence, in this study, the user participation phenomenon is explored through the lens of the commenting feature of FB-based brand communities. The FB commenting feature is appropriate, as it enables content generation by the users, which is crucial for practicing user-centric innovation. The present study investigates the role of individual factors (hedonic experience, habit and self-efficacy), and social factors (social influence, reciprocal benefit, external influence and social presence)

in formulating user's attitudes towards using the commenting feature as a mode of user participation on FB-based brand communities. Also, the impacts of attitude and continuation intentions on users' continuation intentions and their levels of activity are explored. The present study will contribute to facilitating and enhancing user-centric service innovation through SNS-based brand communities.

2 Background

In a recent study, Habibi et al. (2014) conducted an extensive literature review of brand communities, and summarized the work done in this field. It was found that brand communities have been explored from the following perspectives: characteristics, antecedents, and outcomes, from the perspectives of firms and consumers. On the other hand, Cvijikj and Michahelles (2013) found that SNS have been researched based on user types, usage patterns, impression management, motivational aspects, privacy and security issues, and network structure, in addition to their usage in differing domains like education and politics. Furthermore, it was found that there is a lack of research on the use of SNS in the organizational context (Cvijikj; Michahelles, 2013).

Social media has brought about a noticeable change in user behaviour in the online environment (Habibi et al., 2014, Zaglia, 2013). Zaglia (2013) states that social media has made people more open and expressive. On the same note, Habibi et al. (2014) state that people have now began to use real identities instead of pseudonyms for expressing themselves in the online environment. Furthermore, Habibi et al. (2014) report that social media-based brand communities are different from the traditional brand communities from the following perspectives: (i) social context, (ii) absence of any kind of structure, (iii) varied sizes, with abilities to accommodate up to millions of members, (iv) variation in storytelling, as it involves features such as: liking, commenting, and sharing, and (v) the possibility to associate with other affiliated brand communities. Hence, the findings from research on traditional communities might not be applicable to the nature and implications of social media-based brand communities. Furthermore, we argue that it would be worthwhile to investigate whether there are differences between brand communities established on different social media platforms. For example, content generated on FB is visible to the friends of the user through the ticker feature, while this is not the case on YouTube. This kind of setting makes social influence and peer pressure more influential on FB than on YouTube. In this regard, this paper examines SNS-based brand communities with a specific focus on FB-based brand communities.

2.1 SNS based brand communities

The majority of the research on social media brand-based communities addresses SNS (Zaglia, 2013; Habibi et al., 2014; Jung et al., 2014; Wallace et al., 2014; Ding et al., 2014; Muk; Chung, 2014). Zaglia (2013) recognizes the presence of brand communities on FB by comparing FB pages and groups to the three markers of brand communities: consciousness of kind, shared rituals and traditions, and moral responsibility (Muniz; O'Guinn, 2001). From the organization's perspective, the following dimensions of SNS-based brand communities have been researched: (i) brand trust (Habibi et al., 2014; Jung et al., 2014), consumer engagement (Cvijikj; Michahelles, 2013), continuation intention (Jung et al., 2014; Lin; Lu, 2011), joining intention (Muk; Chung, 2014), brand love (Wallace et al., 2014), role of marketer- and user-generated content on user participation (Ding et al., 2014), intention to word of mouth (Wallace et al., 2014) and user participation motivations (Zaglia, 2013).

2.2 FB-based brand communities

Facebook is one of the most popular and largest SNS with international acceptance. Facebook has 1.32 billion monthly active users, and 829 million daily active users as of June 2014 (Facebook newsroom, 2014). Hubspot (2011) reports that organizations consider FB to be one of the most influential social media channels for business-to-consumer businesses. Furthermore, about 80% of businesses are active on FB (Infographics, 2012). Also, about 20 million people become fans of pages on FB each day (Infographics, 2010). The two top brands are: Coca-Cola (with 52.7 million fans) and Disney with 38.6 million fans (Infographics, 2012).

Facebook-based brand communities can take two forms: fan pages and groups. In this paper, we specifically focus on FB fan pages. They were introduced in 2007 to enable organizations and influential personalities to connect with their fans (Sysomos, 2009). As mentioned previously, Zaglia (2013) has categorized FB pages as brand communities.

The domain of user participation in brand communities has been explored from two theoretical perspectives: the social capital theory (SCT) and social identity theory (SIT) (Habibi et al., 2014). The SCT states that utilitarian motives govern consumer's participation in brand communities (McAlexander et al., 2002; Schau et al., 2009; Zaglia, 2013), while the SIT posits that consumers participate in brand communities for the hedonic purpose of satisfying their need for identification (McAlexander et al., 2002; Zaglia, 2013; Muniz; Schau, 2007). In the context of FB, users have different motivations for participating in FB fan pages and groups, including: (i) seeking user-tailored information, (ii) skill improvement, (iii) passion sharing, (iv) social enhancement, (v) entertainment, (vi) enjoyment, (vii) retention and formation of relationships, and (viii) expression of their concerns (Zaglia, 2013). She found slight differences in terms of user motivations to participate in FB fan pages and groups. For example, social enhancement acts as a stronger

motivator on FB fan pages than in groups, while information seeking is a more prominent motivator in groups than on fan pages.

3 Study Methodology

The following section discusses the underlying research questions, research model, measures, and data collection procedure.

3.1 Research Question

In FB-based communities, content generation can take the forms of commenting and individual posts created by consumers. In this paper, we are specifically focusing on the commenting feature of FB-based brand communities. While researching consumer engagement in FB brand pages, Cvijikj and Michahelles (2013) found commenting to be an indicator of consumer engagement. Furthermore, Wallace et al. (2014) suggest that it would be worthwhile to investigate the commenting feature on FB as a proxy for consumer engagement. About 3.2 billion people use the like and comment feature of FB each day (Infographics, 2012). A Deloitte study (2009) of about 400 companies states that around 30% consider the frequency of the posts and comments by the people to be an indicator of the success of their community. Organizations can use the commenting feature to generate new ideas for possible future products and services, improve existing ideas for possible services, and gather feedback to improve existing products and services. Therefore, the present study asks the following research questions:

- RQ1. How do social (social influence, reciprocal benefit, external influence and social presence) and individual factors (self-efficacy, habit, hedonic motivation) impact users' attitudes towards using commenting as a mode of participation in FB-based brand communities?
- RQ2. How do users' attitudes impact their intention to continue using commenting as a mode of participation in FB-based brand communities?
- RQ3. How do users' attitudes towards commenting impact users' activity levels in FB-based brand communities?
- RQ4. How do users' continuation intentions regarding commenting impact users' activity levels in FB-based brand communities?

3.2 Research Model

The research model is based on the theory of reasoned action (TRA). This theory explains the phenomenon behind human actions. The TRA posits that a user's attitude influences their behavioural intention, which in turn impacts their usage behaviour. In our case, continuation intentions represent a user's behavioural intention and a user's activity level reflects their usage behaviour. The factors influencing user attitude have been selected based on the study context. The justification for using the selected constructs has been explained in the following text.

Social Influence (SI): refers to the importance of others' (e.g. family, relatives, friends, peers, neighbours and colleagues) opinions in users' decision-making processes in regard to technology usage (Venkatesh et al., 2012; Hsieh et al., 2008; Irani et al., 2009). A study by de Valck et al., (2009) found that the social network of the user has an influence on their behaviour. For instance, the existing literature has shown that SI has a significant impact on formulation of perceptions regarding technology use (Venkatesh et al., 2003; Anandarajan et al., 2002; Sapio et al., 2010; Zhou et al., 2010) and adoption (Venkatesh et al., 2003; Brown; Venkatesh, 2005; Fulk; Boyd, 1991; Hsieh et al., 2008). Wallace et al. (2014) found that consumers get associated with the brand and related activities for the sake of impression management. Consumers aim to express their social and inner self to others by getting associated with the brand and participating in their activities even if those brands have nothing to do their real life. Muk and Chung (2014) found that the recommendation of important referents influences the user's intention to join brand pages. Furthermore, it is also important for adolescents to verify their choices with peers (Muk; Chung, 2014). Based on the above discussion, we believe that SI can impact users' participation behaviours in FB-based brand communities as well. This leads to the following hypothesis:

H1: *Social Influence* positively influences user attitudes towards using the commenting feature to participate in FB-based brand communities.

Reciprocal Benefit (RB): can be defined as user perceptions regarding the attainment of mutual benefits for their performed actions. In the context of SNS-based brand communities, RB addresses the social and general usefulness of user participation in them (Preece, 2001; Hamari et al., 2013). For example, the existing literature has revealed that users' tendencies to gain recognition and seek information play an influential role in driving user participation in brand communities (Dholakia et al., 2004; Raacke; Bonds-Raacke, 2008; Ridings; Gefen, 2004; Habibi et al., 2014; Hsu; Lin, 2008). With regard to SNS-based brand communities, users sharing their knowledge through commenting on members or moderator posts might seek recognition, or help when needed, in lieu of their contribution. We believe that the

phenomenon of mutual reciprocity is also influential in the FB-based brand communities. The above justification leads to the following hypothesis:

H2: *Reciprocal Benefit* positively influences user attitudes towards using the commenting feature to participate in FB-based brand communities.

External Influence (EI): refers to the extent of the importance of the external entities (e.g. expert opinions, advertisements in the offline and online environment, promotional offers and mass media reports) on the users' behaviours and decision-making (Bhattacharjee, 2000). The EI plays a dominant role in the initial adoption and acceptance of new technologies and information systems (Lee et al., 2003). For example: advertising through different mass media channels is found to have positive influence on technology adoption intentions (Lee, 2003; Mahajan et al., 1990). Furthermore, Muk and Chung (2014) have found that advertising on social media impacts users' intentions to join brand pages on FB through the means of attitude and subjective norms. Moreover, SNS-based brand communities are relatively new to users. Therefore, it is relevant to examine the impact of EI on user participation in FB-based brand communities. The above discussion leads to the following hypothesis:

H3: *External Influence* positively influences user attitudes towards using the commenting feature to participate in FB-based brand communities.

Social Presence (SP): can be defined as the "user's perception of personal, sociable and sensitive human contact in the medium" (Gefen and Straub, 2004). The SNS have been classified as platforms having a medium level of SP (Kaplan; Haenlein, 2010). Also, SNS-based brand communities are better in terms of SP than traditional communities. This is due to the possibility to use various forms of media (e.g. videos and pictures) along with the text. Koh et al. (2007) state that SP is a significant factor enabling effective communication in social contexts. Additionally, they have also empirically shown that the enhancing the level of SP in virtual communities has a positive influence on the posting activity of the members. Similarly in the domain of web advertising, Fortin and Dholakia (2005) report that SP has a strong influence on user involvement and arousal. The above discussion leads to the following hypothesis:

H4: *Social Presence* positively influences user attitudes towards using the commenting feature to participate in FB-based brand communities.

Self-efficacy (SE): can be defined as a user's self-confidence of his/her abilities to accomplish the desired behaviour (Bandura, 1977). Bandura (1977) states that SE influences users' decisions to perform actions. Self-efficacy is found to have a positive influence on technology adoption (Vijayasathy, 2004; Hernandez et al., 2009). Users with high SE are more motivated, and make great effort to accomplish intended tasks (Schunk, 1990 and Bandura, 1977). Based on review of the existing literature on online community user participation, Zhou et al. (2011) report that SE is critical for user participation. This paper believes that SE can also play an influential role in driving user participation on FB-based brand communities. In the context of FB-based brand communities, to enable participation, users' self-confidence using the FB features, together with the content generated through their participation are needed. The above discussion leads to the following hypothesis:

H5: *Self-efficacy* positively influences user attitudes towards using the commenting feature to participate in FB-based brand communities.

Habit (H): can be defined as a user behaviour that has attained a state of automaticity through self-learning (Kim et al., 2005; Limayem et al., 2007). Habit is found to have an influence on technology use (Davis; Venkatesh, 2004; Kim; Malhotra; 2005; Kim et al. 2005; Limayem et al. 2007, Venkatesh et al. 2012). The authors of this study are of the belief that those users who have a habit of participating in FB activities using commenting are more likely utilize it in FB-based brand communities as well. Hence, habitual behaviour is relevant to user participation in SNS-based brand communities. This discussion leads to the following hypothesis:

H6: *Habit* positively influences user attitudes towards using the commenting feature in SNS-based brand communities.

Hedonic Motivation (HM): refers to the user's determination to perform actions based on the elements of fun, enjoyment, and entertainment derived from the technology or service usage (Sledgianowski; Kulviwat, 2009; Lu et al. 2009; Van der Heijden 2004; Igarria et al. 1995; Venkatesh et. al 2012). In consumer behavioural research, HM is found to play a significant role in influencing users' behaviours towards IT adoption and usage (Brown; Venkatesh 2005; van der Heijden 2004). In the context of SNS, pleasure oriented characteristics motivate users to continue their usage (Kang; Lee, 2010; Sledgianowski; Kulviwat, 2009; Raacke; Bonds-Raacke, 2008). Furthermore, entertainment is found to have a positive impact on user engagement in brand communities (Muntinga et al., 2011; Raacke; Bonds-Raacke, 2008). Hence, HM can also lead to user engagement in SNS-based brand communities. The above discussion leads to the following hypothesis:

H7: *Hedonic Motivation* positively influences user attitudes towards using the commenting feature to participate in FB-based brand communities.

Attitude: can be defined as the “individual’s evaluations of an object” (Jung et al. 2014). The SNS-based brand communities are relatively new forms of brand communities (Muk; Chung, 2014). Consequently, users might not have any prior experience participating in these communities. Additionally, Peter and Olson (2010) state that attitude is an important determinant of human behaviour. Therefore, it is relevant to investigate the different factors influencing the users’ attitude formation process in the context of FB-based brand communities. Based on existing research, we hypothesize that attitude can positively influence users’ continuation intentions and their activity levels. The continuation intentions address the human tendency to continue using the commenting function as a mode of participation in FB-based brand communities. For example, attitude is found to have impact on the revisit intentions of the users (Jung et al., 2014; Um et al., 2006; Huang; Hsu, 2009). On the contrary, the users’ activity level deals with their tendency to become more active members and generate more content as a result of receiving more comments on their previous activity.

H8: *Attitude* positively influences users’ intentions to continue using the commenting feature to participate in FB-based brand communities.

H9: Attitude positively influences users’ activity levels in FB-based brand communities.

H10: Users’ intentions to continue using the commenting feature to participate positively influence users’ activity levels in FB-based brand communities.

3.3 Measures

The respondents were asked to evaluate individual and social factors, attitude, continuation intention, and activity level using five point Likert scales ranging from never ‘1’ to always ‘5’ (see Table 1).

3.4 Data Collection

The data was collected from 728 Indian adolescents (aged 13 to 18 years) who were active FB users, using a pen-and-paper survey. The students were recruited from eight senior and junior high schools in four different cities in the Northern part of India during December 2013. Permission to conduct the study was granted by the schools’ managements. They were clearly informed about the study objectives, time requirements and expected outcomes. Student participation was voluntary, and completely anonymous as they were clearly informed not to mention any identification information (e.g. name or roll number). After attaining permission, the study was advertised on school notice boards. The advertisement informed students about the study details i.e. objectives, participation requirements, date, place, and time. Before conducting the study, the students were again informed about the study background, and objectives in detail. Furthermore, before beginning the study, it was made sure that students had experience on FB and using FB-based brand communities. The students were given freedom to leave the study whenever they wanted.

4 Statistical Analysis

The statistical analysis in the present study was performed using IBM SPSS 22.0 and AMOS 21.0. First, the exploratory factor analysis (EFA) was performed using the empirical data in order to examine the factor structure of the study constructs. Later, the factorial solution was re-confirmed using confirmatory factor analysis (CFA). Finally the CFA was utilized to examine various construct validities and reliabilities.

4.1 Exploratory Factor Analysis (EFA)

Before performing EFA, two popular statistical tests, namely the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) and Bartlett’s test of sphericity were utilized. The data returned a KMO value of 0,929 and a significant Bartlett’s test of sphericity ($p < 0.0001$), which indicate the fitness of the data for EFA. The minimum threshold for the factor loadings was 0.45; factor loadings below the threshold value of 0.45 were not allowed. Cross-loadings and parallel loadings were also not allowed. The process of item removal was repeated until a stable set of factor loadings were obtained. The EFA returned total of seven factors (see Table 1).

Table 1. EFA constructs, construct items, factor loadings and Cronbach's alpha.

Sub-constructs (Source)	Items	Factor Loadings	Cronbach alpha
Social Influence (Adapted from Ajzen, 1991)	People who are important to me think that I should post comments.	0.69	0.81
	My friends think posting comments is a good idea.	0.61	
	People who influence my behavior think that I should comment.	0.66	
	People whose opinion I value think I should comment.	0.60	
Reciprocal Benefit (Adapted from Hsu; Lin, 2008 ; Hamari; Koivisto. 2013)	Commenting can be mutually helpful.	0.56	0.83
	Commenting can be advantageous to be me and other people.	0.69	
	Commenting improves my motivation to participate.	0.56	
	FB community encourages me to comment.	0.45	
External Influence (Adapted from Bhattacharjee, 2000)	I feel pressure from media and commercial to use commenting.	0.75	0.87
	I feel encouraged by media and commercial to use commenting.	0.74	
	I feel persuaded by media and commercial to use commenting.	0.74	
Social Presence (Adapted from Gefen; Straub, 2004)	There is a sense of human contact in commenting.	0.76	0.86
	There is a sense of sociability in commenting.	0.78	
	There is a sense of human warmth in commenting.	0.66	
Self-efficacy (Adapted from Venkatesh et al., 2012)	I feel confident using comment function.	0.77	0.91
	I feel confident in utilizing comment function.	0.79	
	I feel comfortable using comment function on my own.	0.79	
	I can easily operate comment function on my own.	0.71	
	I feel comfortable using comment function even if there is no one around me to tell how to use it.	0.55	
Habit (Adapted from Venkatesh et al., 2012)	The use of commenting has become a habit for me.	0.71	0.90
	I am addicted to use commenting.	0.79	
	I must use commenting.	0.75	
	Commenting has become natural to me.	0.54	
Hedonic Motivation (Adapted from Venkatesh et al., 2012)	Commenting is fun.	0.73	0.90
	Commenting is enjoyable.	0.87	
	Commenting is very entertaining.	0.74	

4.2 Confirmatory Factor Analysis (CFA)

The CFA of the seven-factor model returned a good model fit ($\text{cmin/df} = 1.883$; $\text{CFI} = 0.976$; $\text{GFI} = 0.94$; $\text{AGFI} = 0.923$; $\text{RMSEA} = 0.035$; $\text{pclose} = 1.000$). The goodness of the model fit fulfilled the cut-off criteria suggested by previous literature (Kline, 2011; Browne; Cudeck, 1993; Hu; Bentler, 1999).

4.3 Validity and Reliability

In the present study, various types of construct validities and reliabilities are examined. These include: i) *Content validity*: It was ensured by drawing and adapting the items for measuring the different constructs from the existing

literature. The undertaken items have been previously validated to measure the underlying construct by several researchers. Therefore, content validity is guaranteed. ii) *Face validity*: Conducting a pilot study with 20 users representing the target group ensured the face validity of the study. The pilot study was conducted to determine if any items or words were confusing or hard to comprehend by the adolescent users. The feedback from the pilot study was incorporated into the survey before conducting the final study. iii) *Convergent validity*: The convergent validity was ensured using the following three metrics: (i) the average variance extracted (AVE) value for all constructs was greater than 0.5 (Fornell; Larcker, 1981), (ii) the composite reliability (CR) value for all constructs was greater than 0.70 (Fornell and Larcker, 1981), (iii) Cronbach's alpha value for all constructs was greater than 0.70 (Hair et al., 2006) (see Table 1; Table 2). This shows that the present study has met the criteria for convergent validity. iv) *Discriminant validity*: The discriminant validity was assessed using the following metrics: (i) the square root of the AVE for a construct was greater than the correlations of the underlying construct with other constructs (Fornell; Larcker, 1981; Chin, 1998), (ii) the inter-correlations between the different constructs were not greater than 0.9 (Palvou et al., 2007); and (iii) The average-variance explained (AVE) of the construct was greater than the variance between that construct and other measures (Barclay et al., 1995) (see Table 2). Therefore, the present study constructs fulfil the criteria of discriminant analysis.

Table 2. Convergent and discriminant validity of the study constructs (A = Attitude).

	CR	AVE	MSV	ASV	H	SI	HM	RB	SE	EI	SP	A
H	0.864	0.618	0.408	0.258	0.786							
SI	0.911	0.733	0.494	0.294	0.449	0.856						
HE	0.903	0.757	0.396	0.250	0.410	0.514	0.870					
RB	0.834	0.558	0.508	0.375	0.583	0.703	0.571	0.747				
SE	0.909	0.669	0.555	0.319	0.450	0.571	0.553	0.638	0.818			
EI	0.868	0.687	0.408	0.219	0.639	0.380	0.368	0.513	0.395	0.829		
SP	0.858	0.669	0.286	0.238	0.459	0.477	0.396	0.535	0.529	0.478	0.818	
A	0.808	0.648	0.555	0.373	0.526	0.635	0.629	0.713	0.745	0.441	0.525	0.805

4.4 Hypothesis Testing

The research model explains 58% of the variance in the users' attitudes towards using the commenting function to participate in FB-based brand communities. Self-efficacy is found to have the strongest influence on user's attitude. It is followed by hedonic experience, reciprocal benefit, and social influence respectively. However, external influence; social presence; and habit have no impact on users' attitudes. The research model accounts for 31% of variance in the intention to continue using the commenting feature in FB-based brand communities. Also, the model explains 41% of variance in the users' activity levels due to feedback in the form of commenting on their prior activity. Hence, it can be seen that hypothesis H1, H2, H5, H7, H8, H9, H10 stand accepted.

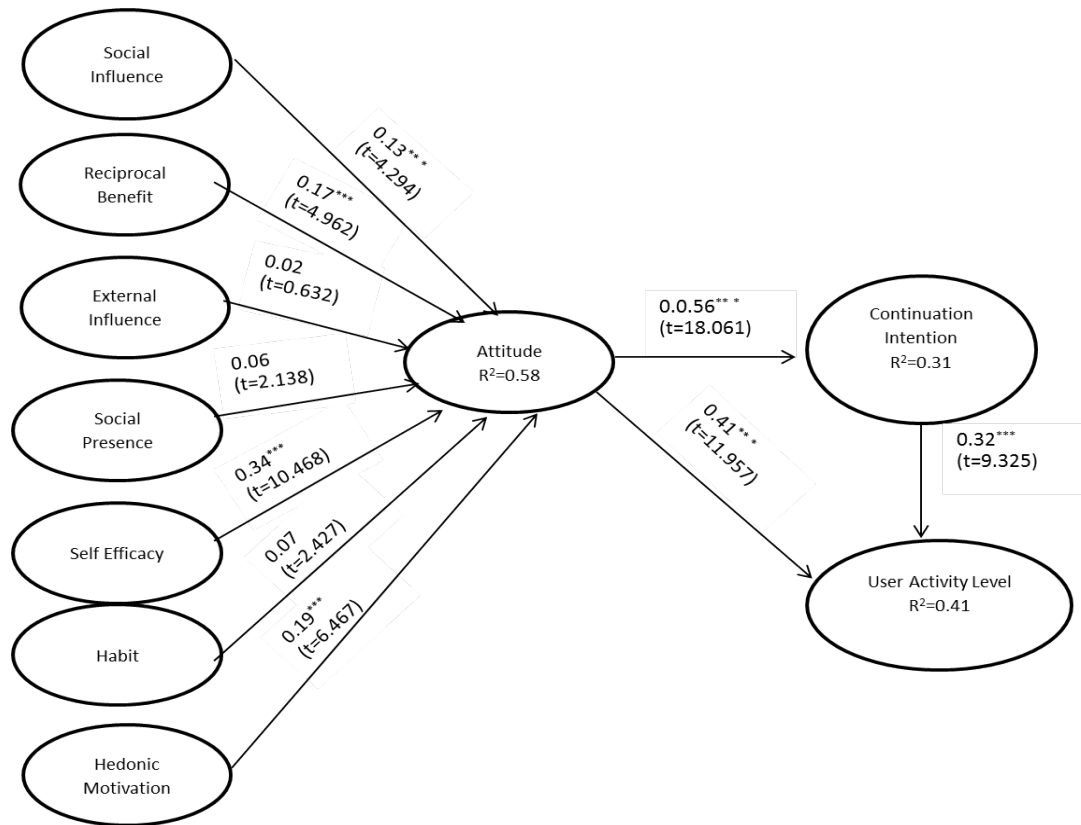


Figure 1. Research Model.

5 Discussion

This paper investigates user participation phenomena in FB-based brand communities with regard to the commenting feature. The impact of individual and social factors on users' attitudes towards using the commenting feature as a mode of participation in FB-based brand communities is explored. Also, the influence of attitude is examined on the users' intentions to continue using the commenting feature, and users' activity levels. Finally, the relation between continued use intentions and user activity levels is also examined. The findings of the study provide information to the practitioners and researchers about factors that influence user behaviours related to formulating positive attitudes towards participation in SNS-based brand communities. Furthermore, it also indirectly predicts which factors encourage higher activity among users in addition to retaining these additional activity levels.

The study findings validate the established relationship between attitude, behavioural intention, and usage behaviour in the context of FB-based brand communities (Ajzen, 1991). This also proves that the retrieved research model correctly explains user behaviour in FB-based brand communities. It was found that high positive attitude leads to higher user activity and continuation intentions in FB-based brand communities. On the other hand, the increase in the users' activity levels can also be credited to higher continuation intentions of the users. However, it has also been found that attitude has a stronger influence on user's activity level than behavioural intention.

The study findings reveal that users' self-confidence is quite important in predicting their participation behaviour. It is found that users with high self-efficacy have a favourable attitude towards commenting. In relation to FB-based brand communities, self-efficacy addresses users' confidence in using commenting, in addition to the content generated through the use of the commenting feature. As the users become experienced in using FB, the self-efficacy associated with content generation will need more attention. Furthermore, anecdotal evidences suggest that users' fear of criticism, relevance, and accuracy of their generated content is one of the major concerns of the users influencing their participation. The influence of self-efficacy on feature enabling participation and content should be examined independently in future studies. Additionally, the study shows that undergoing high hedonic experience by using commenting also leads to formulation of positive user attitudes. The existing literature reports that adolescent users seek enjoyment, fun, and entertainment (Leung; Wei, 1998). Hence, the provision of such an experience by FB-based brand communities makes the user's attitude favourable.

Attainment of high reciprocal benefits leads to development of a supportive attitude among users. In SNS-based brand communities; users can get the following reciprocal benefits in lieu of their participation via commenting: recognition, enhancement of their existing level of learning, and help in resolving their problems. For example, users can enhance their learning through the feedback and criticism that they get from fellow community members or a community moderator. Also, getting feedback on their comments can also provide them recognition, which is one of source of pleasure for adolescents in the online world. Additionally, the presence of social influence also positively

influences users' attitudes towards commenting. For example, in FB the comment given by the user becomes visible to their social network via the ticker function. This supports the impression management needs of the users by giving them a sense of achievement, and by revealing their association with the underlying brand.

The study found no influence of external influences, social presence, or habit on the users' attitudes towards commenting. Muk and Chung (2014) report a positive influence of advertising on users' intentions to join brand pages. However, the present study findings suggest that media and commercials can motivate users to join brand pages, but cannot influence their participation behaviour e.g. content generation via the commenting feature. So, external influences alone are not sufficient to instigate user participation. The impact of other elements of FB-based communities (e.g. content type, communication pattern, or content frequency) on users' attitudes could be reasons behind this that require further exploration. Regarding social presence, users did not find any social presence in the commenting feature, as it might lead to harsh comments and unpleasantness. It can be that the target user group, i.e. adolescents, might not be mature enough to understand the concepts of human warmth and sociability, so they misinterpret them. Furthermore, it might also be possible that the concept of human warmth, sociability, and human touch are irrelevant in relation to users' attitudes in FB-based brand communities. However, this would require further research intervention for validation. Finally, contrary to the usual belief, the habit of commenting does not affect users' attitudes. The study participants are experienced users of FB, so commenting should be a part of their habitual behaviour. But as discussed previously, the possibility of conflict arousal or unpleasantness due to commenting might be acting as a restricting factor. Furthermore, the nature of the SNS-based brand communities (e.g. environment, level of interaction) might also influence users' habitual behaviours.

6 Managerial Implications

The study findings have managerial implications for organizations intending to practice user-centric service innovation via SNS-based brand communities. The study findings provide insight to organizations and brand community managers for managing FB-based brand communities. For example, FB-based brand communities should focus on enhancing users' self-confidence. It can be done by keeping interaction, tasks, and content on FB-based brand communities balanced with the skill set of the users. Users' self-confidence can also be boosted by paying attention to the content they generate. Brand community managers can do this by providing positive feedback to the users and mentioning their names while doing so. Apart from raising their self-confidence, this can also cater to their impression management needs by giving them recognition among their social network. This is possible in the case of FB; as such activities will become visible to the user's social network through the FB ticker. All of the aforementioned actions will also provide entertaining and enjoyable experiences to the users. This will, in turn, encourage and motivate users to continue their commenting participation, and to become more active members; thereby escalating content generation on FB-based brand communities. Efficient management of content generation activities in FB-based brand communities can lead to the generation of valuable information for the organizations. Such information reflecting users' opinions can guide organizational decision-making regarding the provision of future products and services.

7 Limitations and Future Work

The present study also suffers from certain limitations. The study context has some limitations that also offer possible future research directions. The data has been collected from Indian adolescents, which leads to contextual contributions that also restrict the applicability of the findings. In the future, similar research should be conducted on users from different age groups, and also from other regions having different cultural backgrounds. Furthermore, the data has been collected from users self-reporting that they are members of brand communities. In future, the research should be conducted on the users of some specific brand communities. As mentioned earlier, we believe that there might be differences in user behaviour on different social media platforms. However, this argument needs further investigation. Hence, it would be relevant to study the user behaviour on various social media platforms for validating or disproving this hypothesis.

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Regional Innovation Factories: Towards participatory and agile incubation processes

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Abstract. *So far, most innovation policies have been targeted to a narrow “elite” and rather isolated group of economic actors with high technological capabilities. National and local governments have made significant investments in physical and financial innovation infrastructure, devoting less attention to potential innovators and individual-level incentives. Along with an increasing interest in grand challenges and social innovation, participation in innovation activities has recently expanded to include new kinds of actors, demanding an increased focus on the individual level. The main argument here is that an emerging mode of agile innovation platforms (regional innovation factories) can be conceived that is focused on the individuals and providing the right incentives that support their innovative behavior as opposed to the substantial investments in traditional innovation infrastructure. We will present two case studies that provide a good contrast between the two types of policies, namely the Technium program of Wales and the New Factory platforms of Finland.*

1 Introduction

1.1 Cathedrals to communities

Policy-makers all over the world have come to realize that regional policies for research and innovation are “absolutely necessary in the current international economic scenario” (Piccaluga 2006, p. 273). A particular focus of regional innovation policy is the interface between academia and industry; universities are seen as key drivers of regional economic development in the knowledge-based economy (Gibbons et. al., 1994; Etzkowitz & Leydesdorff, 1997; Feldman & Desrochers, 2003; Drucker & Goldstein, 2007, etc.).

There are countless examples from around Europe, and indeed beyond, of policies that aim to foster the birth and growth of innovative knowledge-based firms, often focusing on the knowledge and IPR generated at the interface between universities and industry. Particularly popular have been policies that develop a physical infrastructure to enable collaboration, in particular science parks and incubators (Etzkowitz et. al., 2005; Massey et al., 1992; Phan et. al., 2005; Vedovello, 1997). Studies have found a variable success of these strategies; some science parks and incubators are held up as examples of successful innovation interventions (Casper & Karamanos, 2003; Longhi, 1999; Etzkowitz et. al., 2005). Cooke & Morgan are more critical of the proliferation of these approaches across Europe, describing the physical presence of science parks and incubators in weaker regions as “cathedrals in the desert” (Morgan, 1997). An interesting research question arises from this body of work around why some approaches are successful and others are not. This paper is premised on the notion that if we can better understand what leads to more effective innovation policy, regional governments could better channel their efforts and resources and enjoy economic growth outcomes for their citizens. To borrow Nauwelaers & Wintjes’ point of departure from their own innovation policy study (2003, p.194): “*Innovation is a good thing, at the level of the firm and the region, and there is a call for public intervention to get more of it.*”

In this article we suggest that a great deal of those policies have been created in a top-down fashion, imitating good practices from the outside without carefully considering the context at hand (c.f. Melancon & Doloreux 2013), taking a “one-size-fits-all” approach (Tödtling & Tripl, 2005; Martin & Sunley, 2003). Often they fail to consider the concrete practices and incentives for participants that would make those policies functional. We claim that a majority of policies related to a creation of science parks, incubators, and knowledge transfer schemes represent a somewhat traditional top-down approach of regional and local innovation policies. We suggest, however, that a new perspective should be adopted for regional innovation policies, instead, that would target at creating such local innovation environments that incentivize their potential participants to innovate by creating excitement and providing support not only through public or private service infrastructures but also by fostering community-like elements. While these kinds of environments should provide somewhat predictable institutional conditions, they should nevertheless leave room for individuals and teams to not suppress their zest and creative energy. In other words, instead of traditional science parks and incubators we will call forth what we term as regional innovation factories; a new generation of regional innovation platforms that put focus on individuals and teams, their ambitions and motivation, and creation of like-minded communities with a sense of belonging and mutual support, among other things. This would parallel with an increased impetus on social innovations and on efforts to deal with the “grand challenges” for which a wider circle of stakeholders can participate into (c.f. European Commission, 2010).

To illustrate our point, we will present two case studies that provide a good contrast between the two types of policies that have been implemented in European regions (Stake, 1995; Yin, 2009). The large and ambitious, yet not

particularly successful, Technium program of Wales highlights many of the problems related to the traditional top-down regional innovation policies. New Factory platforms of Finland show some evidence of those features of the new perspective. In the former case, the triple helix approach has been successfully put into practice in the form of an ambitious program, but it has proved insufficient as an approach to foster growth. The latter case provides us some insights what 'extra' might be needed to make such policies 'tick'. By contrasting these two cases, we aim to provide insights to wider innovation policy studies by identifying the critical elements that could help policies in this domain to succeed.

1.2 Established foundations

In this section, we will outline the main approaches of the recent decades upon which regional innovation policies are often built. These include the regional innovation system approach, the triple helix approach and the regional cluster approach, at least. Following on from these existing approaches and theories we will introduce a more recent development; the regional innovation platform. Firstly, the important pre-existing theoretical approaches are briefly outlined here, with the pertinent insights to policymaking highlighted, upon which regional innovation policies in Europe (and indeed beyond) have recently been built.

As already explained, there has been a strong interest in the role of universities as innovation drivers. Often the empirical studies extolling the virtues of universities as regional economic drivers focus on a small set of exceptional examples; leading US examples include MIT and Stanford, and in Europe the examples of Cambridge, Grenoble, Oulu, and Linköping (Cooke, 2004). Theories are provided by academics to explain the importance of universities in regional economic development, and the increasingly entrepreneurial and varied roles ascribed to universities (Godin & Gingras, 2000; Olssen & Peters, 2005; Vorley & Nelles, 2010); two prominent concepts in the academic theory that have infiltrated policy practice are the modes of knowledge production thesis (Gibbons et. al., 2004) and the triple helix (Etzkowitz & Leydesdorff, 1997). Triple helix approach has focused on a certain type of regional setting in which dynamic interaction between government, industry and universities have generated knowledge-based economic growth (Etzkowitz & Leydesdorff 1997, 2000; Etzkowitz & Ranga 2010). Within the approach, sometimes also a 'quadruple helix' of other active participants has been acknowledged (Carayannis & Campbell, 2009).

Looking beyond the university sphere, a group of theories have been proposed that take a more systemic view of innovation, exploring the interlinkages between various actors partaking in innovation activities, and conceptualizing innovation as a non-linear and context dependent phenomenon (Lundvall, Edquist etc). Of the different variants on systems thinking, the regional innovation systems (RIS) approach is most applicable to the regional innovation policy context within which this paper is situated. RIS conceptualizes the regional interaction between producers and users, as well as between "the knowledge generating sub-system and knowledge exploiting sub-system" (Autio, 1998; Cooke, 2004). Appreciating the increasing globalization of innovation activities, the dual concept of "local buzz and global pipelines" (Bathelt et al., 2004) has been introduced, to put more emphasis not only on local formal and informal spillovers but on extra-regional linkages and knowledge flows. The approach has contributed to an increased understanding of institutional underpinnings and evolutionary development paths that play crucial roles.

Closely linked to the systems approach is the regional economic cluster approach (Porter 1998, 2008; Maskell & Malmberg, 2005 etc.), which has recently put more emphasis on innovation and knowledge-driven dynamics within studies of clustering that have for a long time been conceived in terms of traditional agglomeration economies. These knowledge dynamics include unique regional competences and supporting institutions as competitive assets. Recently, the importance of extra-regional, global linkages have been more often stressed (e.g. Wolfe & Gertler, 2004).

However, these approaches lack a firm grip of the more micro-level dynamics; they do not convincingly outline how these dynamics begin to work in favor of knowledge-driven regional development. Increasingly more focus has been put on more individual-level dynamics (Saxenian 1994; Bunnell & Coe, 2001); for example on trans-national entrepreneurship or mobility of individuals energizing innovative behavior in a certain location. Networks and entrepreneurship literature have contributed by studying individuals' attitudes and behavior towards processes of discovering and exploiting new opportunities, and those contexts where these may take place (Down, 2006; Sarasvathy and Venkatraman, 2011). Florida's creative class thesis (2002) has put emphasis on individuals but has done so by restricting population to a rather narrow elite class of innovators and creative professionals that is relevant and by leaving out a majority of people who do not belong to this class. His focus was neither on those micro-level mechanisms that may further enable those potential innovators to unleash their creativity.

In summary, there are plenty of studies that focus on "the region" but not so much about the people within the region. And those that do are very "elite-focused" looking at scientists, researchers, venture capitalists etc. Thus, there is not much focus on the "normal" residents of a region (especially a weaker and peripheral region) and how they can have an access to innovate. There seems to be a need to ensure this in many regions facing structural and societal problems or in cases where, for example, there are educated and competent people who could potentially participate in finding solutions into "grand challenges" with greater access to innovation support and activities, and better entrepreneurial opportunities.

In terms of the policies and interventions put in place to address these issues, this paper suggests that regional innovation policies are not analyzed much except by describing some successful, often unique or extreme cases (such as Silicon Valley) whereas analyses of policy failures is lacking to a great extent. Nevertheless, there are important

contributions that concentrate on, for example, innovation platforms or issues such as incentives and encouraging milieus favorable for innovation, to which the following section turns.

1.3 New perspectives?

This section includes a short literature review on contributions revolved around an emerging concept of innovation platform and the various ways in which it has been defined and treated. In the end, we will present our own conceptualization which emphasizes a bottom-up perspective, instead of a more policy-led conceptualization of, for example, Cooke & de Laurentis (2010), Cooke (2012) and Asheim et al. (2011). Harmaakorpi and his colleagues (Harmaakorpi 2006; Uotila et al. 2012), on the other hand, have approached platforms as kind of a method to solve practical problems in innovative ways but under a guidance of researchers or other specialists.

So far, innovation policies have benefitted from academic research in terms of, for example, outlining some of the key elements and institutions and interactions between them necessary for innovations to occur. However, theoretical models and approaches deployed have been of rather top-down fashion, despite all of their merits. Due to these characteristics, not enough attention has been paid on micro- and individual-level drivers and motivations –it has been generally assumed that, given all key elements are at place, inside the black box of innovation platforms (clusters, science parks, technology transfer schemes etc.) innovation processes would take place seamlessly. Only recently, some of the new approaches have paid attention to the core issue: what motivates people to innovate? Innovation activities are not “business as usual” but needs people who become inspired (Castells 2000; Moulaert et al., 2007).

Traditionally, a motivation for an innovator has to a great extent been seen to be financial; e.g. in science parks, techno-entrepreneurs have innovated in order to reap the financial benefits later if their businesses will success. Von Hippel (1998, 2010), for example, has noted that some users of a certain technology or product have been active in developing those because of other motivations (usability, new functions etc.). Within the open source software movement (Raymond, 1999), a grassroots engagement has taken place in a large number of specialists around the world, often as unpaid, voluntary inputs to generate code. Open innovation concept, introduced by Chesbrough (2003), was originally about large corporations and their management of innovation although the concept has become popular outside its original context and transformed to consist of other type of actors, too (e.g. Perkman & Walsh, 2007). Crowd-funding introduces an interesting perspective on individuals becoming investors of innovations (Ordanini et al., 2011).

In cases where former industrialized cities have faced economic downturn, people may become motivated to innovate to secure their jobs or to invent them new jobs by innovating, not primarily to become rich. We term this the “inclusive innovation” perspective. Here, we may learn from the entrepreneurship literature that deals with “necessity entrepreneurship” (Block & Wagner 2010). However, this has a somewhat negative tone depicting innovators struggling whereas there is also evidence (Reynolds 2002) of people fulfilling themselves by innovating new solutions, products and applications. Of course, both perspectives are relevant.

Thus, those conducting innovative activities used to be people working in R&D units whereas innovation activities have recently become more usual for a much bigger number of people in a much more varied contexts than it used to be (see e.g. Grimm et al., 2013). It seems to be also politically viable to enable people to innovate, to increase their ability to navigate in increasingly insecure labor markets or to facilitate their efforts to generate new forms of services (Needham, 2007), among other things.

All this means that a rationale of the regional innovation policy needs rethinking. We argue that the innovation platform approach is useful for this as it puts emphasis on the actual micro-level context mostly from the bottom-up perspective. Nevertheless, it has so far been somewhat fuzzy concept (c.f. Markusen, 2003) without a strictly defined content and thus insufficient to advise policy-making. As an interesting emerging form of innovation platform, we will here introduce a concept of a regional innovation factory (RIF, see also Raunio & Kautonen 2014 and Kautonen & Raunio 2014). It can be seen as a more agile, informal, DUI- and community-based model of an innovation platform than, for example, a traditional science park model.

Regional innovation factories are fuelled by individuals’ and small informal groups’ innovativeness and strong motivation to excel. University students, other individuals such as unemployed experts, and their teams are gaining more importance as actors nurturing innovation processes (Raunio et al., 2013). Whereas firms and research laboratories tend to follow their long-term strategies and cut out projects that are not in their core interests, RIFs provide seedbeds for numerous short-term innovation projects to flourish. In a spirit of democratizing, inclusive and open innovation models, phases from idea generation to innovation commercialization may take place in different places and organizations or outside formal organizations. Examples of this can be IPR generated by a firm transferred to a student group to develop it into a demonstration to determine its business value or leftover ideas developed into businesses by specialists who have been laid out from large corporative R&D labs.

We outline the key functions of regional innovation factories to be a) business generation (e.g. new incubator and start-up practices); b) hands-on training of future innovators often in the global environment; c) attracting innovators and investors also from abroad; and d) supporting the emergence of regionally rooted innovation communities. For RIFs, two features essentially make them distinctive from more traditional innovation platforms such as science parks, incubators, and cluster programs: first, community-like dimension and, second, broader and more heterogeneous group of stakeholders and innovators.

The concept of an innovation community has recently become more relevant than before because innovation processes often tend to involve several actors with incentives other than financial ones being the most important. The innovation community may be formed of a group of actors essential to or supportive for an innovation process. Communities may occur within or across organizational boundaries, they may be of different sizes regarding the number of their participants and they may range from local to global. For example, the following definitions and types of communities or networks discussed in the literature may help to define an innovation community:

- A hacker community or other web-based communities, such as open-source software developer networks (Himanen 2004) with their emphasis on mutual help, common goals, and reciprocity;
- A community of practice (Lave and Wenger 1991; Wenger 2000) has some features similar to an innovation community, referring especially to the learning of a group of actors who share the same interest in solving a certain (temporary) problem, yet CoP refers to a more static setting while innovation communities deal with a changing phenomenon;
- Open innovation, networked and user-driven innovation refer to a similar kind of phenomenon, i.e. the need to link more actors to the innovation process in order to create new knowledge or a new product, or to commercialize a new product. West and Lakhani (2008) have attempted to come up with a concept of an innovation community from the open innovation perspective.
- A global innovation network (GIN) connecting distant actors to the same innovation process (Barnard and Chaminade 2011), however, usually focusing on an organizational level, not team or individual level as in the conceptualization in this paper.

In the context of innovation-driven regional development, it has also been suggested that innovation communities (e.g. networks of government-supported agencies, university-based groups, business executive groups, NGOs) could create a “community of communities to support the learning enhancing the regional economic development as well as development of innovation communities themselves” (Lippitz et al. 2013, 63–65). We share the view that a “community of communities” could enhance the innovation-based development and there is a need for a regionally oriented home base for this purpose. Innovation communities are also relevant due to a community-building approach that emphasizes the mutual support among the members. Helping and supporting others without expecting financial reward (not at all or not immediately or directly) are stressed.

1.4 Goal, research questions and structure

The paper intends to conceptualize a new perspective on regional innovation policies, i.e. regional innovation factory (RIF), based on an international scholarly discussion on regional innovation platforms. In order to do that, the paper scrutinizes two contrasting cases to empirically illustrate its main points. The idea is that such RIFs seem to hold a potential to make, among some other measures, regional innovation policies to ‘tick’ due to their ability to provide individual-level incentives that are often non-existent or are not thought of in designing and conducting policies.

Through the empirical outcomes and theoretical elaboration, we aim at contributing to a discussion on value-adding policy development in the field of regional innovation policies. The key questions we aim to answer to are the following: 1) If we accept the view that there is a tendency towards an expansion of participation into innovation activities (see also the literature review), then what does this mean in terms of regional innovation policy-making? 2) Can we identify some of those factors that would make regional innovation policy measures more attractive for a large number of individuals in order to incentivize them to innovate and to engage in entrepreneurship, and what would be some of those institutional preconditions to foster those developments?

This paper examines two case studies and conducts an analysis based on a comparison between them. Firstly, the methodology and methods behind the research will be explained. This is followed by an introduction to the two cases in question both in terms of the regional settings and the specific programmes being examined. Then the cross-case analysis is presented, which looks at the similarities and differences between the two programmes and why these exist. The final section presents conclusions and policy lessons for both of the cases in question but also of wider relevance to policymakers and researchers in the field of regional innovation policy.

2 Methodology and data

The paper will deploy a case study methodology in a form of two cases that gives us a good contrast and allows us to empirically investigate the debates about the applicability and replicability of prominent modes of regional innovation policy in different peripheral contexts. The two programmes selected have similar underpinning rationales and motivations, but have been designed and implemented in quite different manners, and have experienced different trajectories and results. This makes for an interesting study of why one approach has been arguably successful, and the other less so.

We argue that the Technium program of Wales highlights many of those problems related to the traditional regional innovation policies, whereas the New Factory platform of Finland shows some evidence of those features of the ‘new school’ of regional innovation policies. This article presents its findings in a fairly tentative manner, and we cannot assert with total confidence an analysis of the success or failure of the programmes because both are still underway.

This investigation draws on various sources of qualitative data to build up a comparative case study of two different interventions, in two different regional contexts. Innovation is a geographically and historically determined phenomenon (Mackinnon et. al., 2007; Storper et. al., 2011), and so a methodological approach that takes account of these factors was deemed necessary. The case study approach was chosen because it allows us to draw comparisons across different studies and draw out some interesting lessons about theory and policy that could be of use to academics and policymakers in different regional settings (Stake, 1995; Yin, 2009;): *“Case study research... offers policy makers opportunities to increase their understanding of complex social settings and programmes in order to inform the policy judgements they need to make.”* (Simons, 2009, p.107).

As such, through the empirical outcomes and theoretical elaboration, we aim at contributing to a discussion on value-adding policy development in the field of regional innovation policies. Two policy interventions were identified with similar underpinning approach and logic, and are considered prime candidates for a comparative case study of innovation interventions to shed some light on why certain interventions in certain places work and others do not.

To elaborate on the specific methods employed and data collected: both empirical case studies were conducted in a similar manner, which allows for comparison and triangulation to take place, both of which are central elements of the case study methodology (Stake, 2005, p.454, and Yin, 2009, p.18). The timescales of the two case studies are different, because the programs under consideration were not implemented at the same time: the Technium program in Wales was launched in 2001 and continues to run, but the New Factory in Finland was implemented from 2008 onwards. Before the analysis of the two cases is provided, some background context about the two studies is provided with further details about the empirical research undertaken in each case.

2.1 Wales

Wales is one of the four “home nations” of the UK, alongside Scotland, England, and Northern Ireland. It has a degree of self-governance; innovation and economic development is addressed by the Welsh Government and Assembly (as opposed to the central UK government and Parliament) and so provides an interesting case of a semi-autonomous region within the EU taking its own approach to innovation. It is important to recognize Wales as a weaker region, with half of the country receiving the highest level of Structural Funds from Europe, and sitting at the bottom of UK regional competitiveness tables (Huggins & Thompson, 2010). The Welsh approach to innovation policy and programs over the last fifteen years has been studied at length, and there is one particular program that has emerged as central to the innovation agenda: the Technium program.

The case study of Wales combines policy analysis and stakeholder interviews to provide a comprehensive evaluation and discussion of Welsh innovation policy. The time range of the case study is from 2001 to the present day. The policy analysis was triangulated with 57 anonymized, semi-structured interviews were conducted with key stakeholders from the business, government and academic spheres in Wales. The purpose of these interviews was to gain the perspectives of the different stakeholders involved either in the formation, delivery, or “use” of innovation policy on how it has evolved and their evaluations of the specific action taken.

2.2 Finland

Finland, on the other hand, has gained a reputation for its national innovation system and yet, after Nokia’s crisis, the country has seemed somewhat vulnerable for global economic restructuring (see e.g. Financial Times, September 7/8, 2013, 5). Much hope has been attached to a large cohort of small, knowledge-based growth-oriented companies that have emerged in a wake of Nokia. However, it is too early to say how the national economy will cope with its recent challenges.

The case of Finland similarly combines policy analysis and stakeholder interviews to provide a comprehensive evaluation and discussion of a Finnish innovation policy especially regarding one of its most successful ongoing activity at the regional level (New Factory). The time range of the case study is from 2007 to the present day. The policy analysis is based on 12 semi-structured interviews with key stakeholders from the business, government and academic spheres in Tampere, the main location of activities (Tampere is the second largest city-region in Finland as well as the second centre of R&D of the country). The policy analysis is partly based also on a participatory action research of longitudinal character. This includes, among other things, one of the authors to participate into the steering group of one of the New Factory sub-programs from 2010 until 2013. Active participation has enabled a researcher to gain material and insights as well as to lead discussions that have accumulated information otherwise difficult to gather. However, there is also much formal data on program performance (results and impacts etc.) available that helps to objectively evaluate the success of the policy.

2.3 Contrasting Wales and Finland

These two regional settings provide us with an extremely interesting comparative case study. Both regions are peripheral in the European sense, with small populations (approximately 5.4 in Finland and three million in Wales) and a combination of city and rural settings (see Table 1). Whilst there is some difference in the relative economic strength of Finland compared to Wales, and this leads to interesting discussions about regional innovation policy and economic

development in divergent economic contexts. The selection of these two case studies was primarily based on the interesting comparisons that can be made between the two programmes, which have a similar foundation of stimulating innovation through variations of the incubator approach but have somewhat divergent experiences. The following section presents the two case studies, explaining the two programmes that have been implemented to create a foundation upon which the discussion and analysis can be built.

Table 1. Comparative data for Wales and Finland.

	Wales	Finland
1. Number of inhabitants , million (2011/2012)	3,06	5,4
2. GDP (PPP) per capita, USD	30,5	36,4
3. Key industries (%; employed person by industry)*	Services 74,5 Manufacturing 10,1	Services 74,6 Manufacturing 14,2
4. Employment rate** (2010/2012)	67	69
5. Level of education , tertiary level (% by population aged 15)	10 have not achieved 5 GCSEs or equivalent	28,2
6. R&D expenditure (% of GVA/GDP)	1,2	3,6
7. Innovation activity (% innov. active of all enterprises)	40,6	56,2
8. Internet users (%; used within last three months)	76	90

*Services (ISIC classification: G–S), Manufacturing (ISIC classification: C) **by persons of working age (15–64)
Statistical sources for Wales: 3) National Assembly for Wales; 5) Welsh Government; 6. Office of National Statistics; 7. Community Innovation Survey via UK Government; 8. Stats Wales, Welsh Government Statistical source for Finland: Statistical Yearbook of Finland 2013, Official Statistics of Finland, Statistics Finland: Helsinki.

3 Technium and New Factory

This section presents the two cases that lay an empirical foundation for the analysis. Table 2 shows the main characteristics of the two innovation policy instruments, Techniums in Wales and New Factory in Tampere, Finland. It can be noticed that both instruments have broadly similar characteristics and they aim at nurturing new knowledge-intensive businesses in their respective regions.

Table 2. Main Characteristics of the Two Programmes.

	Techniums	New Factory
Main functions	Support and office space for high tech firms	Services, support and premises for innovation projects and start-ups
Goals	To support (university spin off) high tech firms to commercialize research for economic growth in Wales	To boost innovation culture and entrepreneurship in Tampere Region
Organizational setting	Triple Helix: WDA, Welsh universities, new technology-based firms	Triple Helix: Hermia Group, City of Tampere, Tampere-based universities, heterogeneous group of new and mature firms
Time period	2001, ongoing	2008/2010, ongoing, expansion (international network of units)
Financial resources/budget	£93.4m (appr. 114 M€ total development cost), 89% public	€5.9m; 60.3% public
Notable outcomes	Technium in Swansea originally a success that led to a creation of other sites	98 new firms, 238 participating firms, 3600 students as participants, 600 new jobs
Important to note	In decline (reduction of location from 10 to 4)	Continues to grow and expand to other locations also abroad

3.1 Techniums

One of the most high profile innovation interventions over the last decade in Wales is the Technium programme, which features in all of the economic strategies and represents a significant infrastructural investment. The Techniums provide

office space and support for high-tech firms to commercialise research and turn this into economic growth; it is especially aimed at university spin-offs and high-tech firms, and began its life as an alliance between the universities and the government. The rationale behind the programme was that the universities have expertise in IP, and the Welsh Government in physical property and business support; it was designed as a combination of these elements. The Technium programme is concerned with building the appropriate high-tech infrastructure to create a knowledge-based economy in Wales and aims to address some of the fundamental problems in the Welsh innovation infrastructure, such as the lack of broadband in several areas.

In its original design, the Technium concept encompassed business support, networking activities, and advisory services to make it more than simply a physical incubator space. As the discussion of the New Factory will illustrate, there are common elements between both programmes, which aim to be more than incubators. However, a key difference between the two is whether these extra elements were delivered. In the roll-out and delivery of the programme across Wales these were lost, reducing the Techniums to straightforward physical incubators. The initial Technium in Swansea was opened in 2001, and in 2002 a new regional innovation strategy was launched with a nationwide Technium network at its heart. At the programme's peak, there were 10 Techniums across Wales, but this has recently been cut down to 4 because of high costs and low occupancy rates. Morgan (2012, p.16) expresses his surprise that there has been no public inquest into the "failure of an experiment that cost around £111 million. Through considering both the formal evaluations that have been carried out by other researchers and the insights gained from the interviews with key stakeholders this section provides some explanations as to why the Technium programme has not proved to be successful in Wales.

The most obvious problem with the programme was the loss of the extra innovation elements, in particular the advisory services and management assistance, which led to the replication of traditional incubator approaches (Cooke & Clifton, 2006). Cooke (2003, p.19) does not see the Techniums as innovative, and are simply properties leasing space; a design flaw in the concept is that it replicated old approaches and failed to prioritise management assistance through, for example, allocating part time space to venture capital, legal advice, and management accountancy. As one economic policy-maker put it: "[Techniums] weren't all proper innovation centres".

Another issue was the over-ambitious nature of the scheme and the fact it was rapidly expanded to ten centres across Wales based on the success of the first Technium in Swansea. Little rationale has been found for the roll out of the scheme (DTZ, 2010), and stakeholders highlighted the problems with trying to replicate the success of one case across the whole of Wales: "We've had tendency in Wales if something works well once then it will work ten times better if we have ten times as many, and it appears unfortunately that wasn't the case" (Innovation Policy-maker).

Furthermore, the centres could not be located in the most appropriate locations where the business demand already existed because of the restrictions on where the European Structural Funds could be spent; the Convergence areas of Wales are the poor and rural areas to the North and West. Had the Techniums been located in the economically stronger city areas (such as the capital- Cardiff) it is likely they would have met more business demand from high-tech firms and start-ups located in those areas: "I think that model was flawed in so much as it was necessarily tagged to European funding, which is necessarily tagged to particular areas of Wales... There was no critical networks around it in some areas, I don't believe in some areas there has ever been a business case. There have never been businesses to populate that." (Business Representative)

The scheme was overambitious because it assumed that over 400 incubator spaces could be filled, which turned out not to be the case (Cooke & Clifton, 2006). As a result, occupancy rates were very low, only 4% in the Pembrokeshire Technium (DTZ, 2010): "The 'Emptiums'... there was nobody there. The place was empty." (Professor of Business Studies).

This resulted in very high costs per job of £190, 000 (DTZ, 2010); however Bristow et. al. (2007, p.25) point out that these tended to be graduate, R&D based positions, which form the basis for more high value-added growth in the future.

So, overall the scheme has not been considered a success, and there are a number of specific problems highlighted by evaluators and stakeholders interviewed. More general problems such as a lack of specific objectives and rationales, and the lack of evaluation and monitoring of the programme have also been underlined (DTZ, 2010). One of the founders of the programme, explained that "poor leadership and failure by universities to buy into the scheme stymied its chances", and universities were more interested in creating IP than exploiting it. From the governmental perspective, the former Economic Development Minister blamed failings by senior civil servants in his department; "the concept was sound...the management and roll- out was deficient", and insists despite their claims otherwise, that civil servants did not keep ministers informed on the performance of the programme and major decisions being taken (Davies, 2012). The following interview quotes reasonably summarises the opinions expressed about the programme: "We have seen largely that it has been... Discredited is a bit harsh. But largely it has not been a roaring success" (Business Representative); or: "I think the Technium network is not one of the greatest examples of what we have to show to the world" (Professor of Enterprise).

On a more positive note, Bristow et. al. (2007, p.25) suggest that the Techniums facilitate university-business knowledge transfer thus "laying the basis for a new knowledge economy" (2007, p.25). They also explain that although the cost per job seems very high, the jobs tend to be graduate, R&D based positions, and form the basis for more high value added growth in the future (Bristow et. al. 2007). Although four Techniums do remain, the future of the remaining Techniums is somewhat uncertain. It remains to be seen what the fate of the remaining Techniums will be, and whether

they will be more successful now that the surplus supply of space has been cut. In summary, the Welsh Government's most significant innovation project since its birth in 1999 has been reviewed by researchers and key stakeholders in the innovation system as unsuccessful, and is widely seen to have been a waste of money that can hardly be afforded in a weaker region such as Wales. Whilst the underlying concept was reasonably sound, there were a number of fundamental problems in the delivery and roll-out of the programme which led to it being little more than a traditional incubator approach, providing physical space for innovative firms, which were not filled. However, as one interviewee was at pains to point out, this experience is far from specific to the Wales case study: "Wales is not alone in this. If you go around Europe there are many of these examples of effectively white elephants" (Professor of Economic Geography).

It is important at this point to highlight the divergence in the performance of the different Techniums. Whilst the majority have not been particularly successful, there are two centres that are broadly seen to have been a success and look set to continue to exist in the near future. The first is the Swansea Technium, the original Technium, which is thriving in its location at Swansea University. The second is the St. Asaph Technium, which is focused on the strong Opto-Electronics sector in the area and has strong links to Glyndŵr University in the north of Wales. Of the eight centres, these are the only two that Welsh stakeholders consider to really have been a success.

3.2 New Factory

Tampere city-region is the second largest by population in Finland, and also the second after the capital city-region Helsinki as a node of Research and Development by its three universities, large R&D units of the private sector (e.g. largest R&D facilities of Nokia Group world-wide) and resources (e.g. financial inputs for and personnel in R&D). However, as all industrial centres of Finland, the region has faced pressures of globalization and industrial decline for decades. On the other hand, the region headed by the City of Tampere has explored and experienced regional innovation policies already from the beginning of 1990s with many policy successes as well as failures (Sotarauta & Kautonen, 2007; Kostiaainen & Sotarauta 2003; Valorinta et al. 2010). After a construction and long-term operations with science parks, "traditional" incubators, university-industry technology transfer schemes and cluster programs, some of the policy-makers in Tampere came up with a policy model that has become widely recognized as a good practice. Representing both private and public organizations, these policy-makers had gained a considerable experience of innovation policy and they wanted to combine these lessons with their aspiration to create a more "agile" and inspiring instrument in a fashion of open innovation.

The New Factory is a combination of several "engine rooms" (*Demola*, *Protomo*, *Suuntaamo* and *Accelerator*), which have their own functions but work towards the same goal of creating new businesses through and from open innovation processes. Demola is an environment in which to generate prototypes and demonstrations from ideas coming typically from private firms, developed in projects by multidisciplinary student teams. Protomo functions in a somewhat similar way, but instead of students as its "workers", it employs self-employed entrepreneurs and experts often in a phase of career transition. Suuntaamo is a kind of open test laboratory for new products and processes, itself already a privatized spin-out of New Factory. The newest engine, Accelerator, provides new businesses with various business service resources and competencies, including help to find matching venture capital. In addition, a new First Customer initiative helps young firms to identify and approach their very first business-to-business customers and partners. Common to each engine is an attempt to operate on principles characterized as "customer focused, down-to-earth, agile, cost-efficient and effective". So far, the most long-standing and also most visible engine of the New Factory is Demola. A typical collaboration scenario in Demola is the following:

- A firm that has a concept or idea that is subject to high levels of uncertainty decides to outsource the development process for Demola to come up with a prototype or demonstration through further development and testing;
- The concept is evaluated and formalized into a project design by Demola;
- A multidisciplinary student team is built around the concept, gathering student candidates from the universities and polytechnics, and a project contract is signed by the stakeholders (the firm and the team) including issues related to IPR and the timetable;
- Concept development starts, lasting 3–8 months, with sparring and support by Demola and the firm, and including a concept or prototype testing conducted with the users; and
- Demonstration of the concept or prototype is carried out by the student team, followed by project evaluation and the finalization of license agreements.

The benefits of Demola are not limited to a single firm, since the student team also has a chance to utilize the created immaterial asset by setting up a start-up company in the case in which a firm does not acquire a license for the IPR. Students may also be recognized for their talent, leading to employment. All the IPR generated during the project belongs to the student team. At the end of the project, the partner firm can acquire a license for the results and reward the students for their work according to the performance criteria agreed earlier. The method is notably effective, due to the well-defined IPR framework (avoiding the contractual costs of collaboration), the focus on the concepts preselected by firms and the diverse set of skills and ideas of the students working on it.

Behind the New Factory, there are several key actors of the regional innovation policy, including Hermia Ltd. (a semi-public local innovation agency) and the three universities located in the city. The essential characteristics of the New Factory are openness and many community-like features that make it stand out from the traditional innovation platforms.

New Factory was established in the spring 2010 following the convincing experiences received from the two initiatives of Demola and Protomo established in 2008. NF is a key part of a new local innovation program, Open Tampere, which was launched first as a pilot in 2010 and then as a large-scale program from 2012 onwards, scheduled to last until 2018. This program aims at fostering new growth of firms and international businesses and at promoting a continuous innovation-based transformation of the traditional industries. It also involves stakeholders such as students, other citizens and heterogeneous local communities in participation in many ways.

In less than four years, New Factory has succeeded in generating 583 demonstration and prototyping projects with 238 partner companies; helping to generate 98 startups and 600 new knowledge-intensive jobs; and attracting 18 million euros of funding for startups and innovators (Matikainen 2013). Costs of the New Factory are about 5,9 million euros for a period from 2008 until the end of 2013.

The Assembly of European Regions announced New Factory as winner of the European Innovation Award in 2010. In addition, Demola received the Baltic Sea Region Innovation Award in 2012. New Factory is well recognized also on a national level and used as one of the key national examples of new open innovation paradigm by the Finnish Ministry of Employment and the Economy. NF is located in “Kuusivooninkinen” (six floors), an old cotton factory building constructed in 1837, by then the tallest factory in the Nordic countries. Virtually no funding at all is spent on the premises except for the rents.

These open innovation platforms are environments for product and service development and for new market creation. Their processes, from idea generation to real business, are guided by clear, explicit procedures that have made operations easy and have left space for creativity. However, a fundamental idea behind the obvious success of New Factory is that its engines have attempted to create a ‘community spirit’ among the participant individuals and are, at best, fuelled by participant individuals’ real, genuine motivation.

Advantages of Demola’s and Protomo’s platform concepts have been recognized elsewhere. Consequently, the Demola network, for instance, has already spread to eight other European cities and is about to extend to other continents, too (Demolas abroad, at present, in Norrköping, Linköping, Malmö, Lund, Vilnius, Budapest, Riga, and Maribor). Protomo network has diffused rapidly to several other cities (8) in Finland.

However, there are some challenges for the New Factory: Mostly based on project-funding (of which 60% from public sources), continuation in the future is to some extent open even if Demola, Tampere, was able to recently come to an agreement with the three local universities and the city on a long-term funding principles. Another future issue of NF is how to achieve a big regional economic impact. Although the numbers of participant firms and people are impressive, there are also a considerable regional economic structural change taking place which sets a lot of future expectations for the whole programme.

3.3 Cross-case analysis and conclusions

In this section the two cases of Technium and New Factory are compared and contrasted to draw some lessons about innovation programmes that follow a broadly conceived incubator approach to economic development (see Table 3). There must be some caution exercised when drawing these conclusions due to the heterogeneous nature of the two regional case studies. The situation is not so simple to be able to say that one approach is successful and another is not, and the two programmes are functioning in different geographical, political, and historical contexts. This paper appreciates that a number of different factors impact upon the success of a programme or implementation and that it would be overly simplistic to pinpoint particular elements and suggest causality of success or failure. Instead, this paper considers firstly the similarities and then the differences between the two approaches in order to draw out some lessons about how incubator approaches can be better employed to achieve increased levels of innovation at the regional level.

The similarities between the two programmes are as important as the differences because they underpin the logic behind comparing the two approaches. Both programmes are underpinned by the same principle of providing the space and support for innovation activities to take place, as per the rationale presented in the first section of driving regional economic growth through innovation supports. Both approaches are premised on the assumption that encouraging indigenous innovation, as opposed to importing or transplanting innovation from elsewhere along the lines of inward investment, can help drive economic growth at the regional level and is an appropriate strategy for peripheral regions of Europe. Another similarity is the focus on universities as sources of ideas, knowledge and human capital; both programmes were designed to have strong links with regional institutions. They both build on a long tradition of incubation and science park approaches in Europe and beyond. However, despite these fundamentally similar underpinnings, the two programmes have some important differences that are important to examine in order to draw out further lessons about the usefulness and best-practice regarding incubator style approaches in the peripheral region setting.

Table 3. Main differences between Techniums and New Factory.

Techniums	New Factory
Top down	Bottom-up
No focus on incentives	Incentives for key stakeholder groups important
Participation: limited to few groups of stakeholders (“innovation elite”)	Participation: widely distributed including new groups of participants (“democratized”, inclusive)
Much focus on physical space	Much focus on activities and practices
Organization-oriented	Individual- and team-oriented (community aspects)
Building new incubators from scratch	Re-generating old buildings into new uses
High capital investment	Lower capital investment
Quickly rolled out to ten different locations	Smaller scale, yet two successful sub-programmes rolled out to new domestic and foreign locations but without top-down control and guidance

Perhaps the main difference between the programmes is the top-down nature of the Technium programme, compared to the more bottom-up approach taken by the New Factory, which is much more community premised. Whilst the original Technium in Swansea developed in a bottom-up manner, arising from local needs and the impetus of Swansea University, as the programme was rolled-out across Wales it became increasingly top-down and prescriptive. The Welsh Government attempted to emulate the successes of the Swansea centre in ten different locations across Wales, and as the discussion above illustrates, this was largely unsuccessful. The connection between local needs and supply of infrastructure and services become disconnected, and the rationale for implementing the programme across Wales was lost. The New Factory, in contrast, takes a more locally-based approach to economic development, concentrating more on the grass roots level. It is important that the New Factory programme retains this local connection, and that its successes at the local level do not lead to a replication as was the case with the Technium.

The conceptualization of the nature and process of innovation that both programmes take is somewhat different. For New Factory, the key starting point is innovation project work whereas in Techniums, physical spaces were first set up and only then followed by activities targeted to get innovation activities to go on, which is quite typical for the traditional approach of science parks. New Factory would not exist without the innovation projects, there is all the time a big flow of projects beginning and ending (with more than 90 per cent license buy-in from the participating companies in Demola, for example). In stimulating innovation activities from the ground-up, the New Factory avoided the problems encountered by the Technium programme of there being a lack of business demand for innovation services in the area. Having already pump-primed innovators in the local area, the New Factory ensured a lively and fruitful environment within which to situate an incubator; the “local buzz” was already created. The New Factory programme has shown a greater appreciation of innovation a participatory and interactive process that can come from anywhere, whereas the Technium was quite linearly focused on spin-outs and university based innovation.

Another key difference between the two approaches is how far beyond the traditional incubator approach they go. The traditional incubator approach is premised on providing the space for innovative high-growth companies to set up, usually in association with a university or research institution of some sort. However, these programmes were both premised and established along the lines of an incubator-plus approach, to incorporate wider networking, business services, and supportive activities. A major problem with the Technium programme in Wales is that these elements got lost as the programme progressed; the management and innovation support elements did not materialize, and the centres descended into purely physical manifestations. In contrast, the New Factory has successfully established a supportive network-based environment where the people are more important than the physical property. There are many measures taken to ensure the programme retains its status as a more-than-incubator including networking events, training, showcases et cetera. These other activities also existed at the outset of the Technium programme, providing a lesson as to how priorities can change and elements of a programme can get lost as it gets bigger and bigger. It is important that the New Factory retains its extra features that ground it in the participatory and bottom-up mode of innovation.

Table 3 shows the differing cost between the two approaches; this is partly to do with the scale and length of the programmes because the Technium was running already for several years before the inception of New Factories, and at its peak totaled ten centres across Wales. Indeed, the scale of the programme was one of its core problems as the interview quotes provided above illustrate. Another reason for the difference in cost was the manner in which the New Factory regenerated existing physical property, whereas the Technium programme built new centres at great cost to the public purse. Wider benefits stem from economic regeneration, and the New Factory programme is breathing life back into the ex-industrial buildings that dominate the Tampere skyline. This is adding to the wider feeling of local buzz and excitement around innovation activities, and is bringing wider benefits to the residents of the locality beyond the purely economically derived benefits to the individuals and companies there. In the Technium case, the centres were often built on “green-field” land in locations beyond the towns and cities. Whilst many of the buildings look impressive, they are

not contributing to improving the local urban environment or providing any services or access to local people. They are very much “cathedrals in the desert”.

The difference in resources could be an important factor behind the progression of the two programmes: due to the Convergence funding available in Wales, there was a large financial resource available to develop the programme. This is in contrast to the New Factory, which was necessarily much more constrained. Perhaps, paradoxically the constrained resources of the New Factory may have led to it being a more bottom-up and community-focused intervention. To elaborate, the New Factory involved a small local network with representatives from international business and regional development agency and universities, with rather scant funding resources were forced to focus on content. This differs greatly from abundantly funded government and EU program in Wales, which was delivered by the central funding agency on a much larger scale with relatively little local impact. While the biggest problems in Welsh case were related to extension phase of the program, and while the original Technium in Swansea was successful, also in the case of New Factory the expansion phase may be considered as critical. The expansion has taken place thus far through Demola and Protomo activities, but both in very different modes, seems to have avoided some of the problems of replicating approaches in different contexts by maintaining the demand-based and bottom-up approach.

4 Traditional model to regional innovation factories

4.1 Discussion and lessons learned

In this section, we provide a discussion based on the comparison of the two cases presented above. From this discussion a number of policy lessons emerge (see Table 4). Lessons emerge for policymakers in the two regional settings under examination (Finland and Wales) but also for those in other regional settings considering or attempting to implement similar incubator-based approaches. There is also an interest to researchers examining regional innovation policies in programmes, who may see parallels and lessons from their experiences elsewhere.

Table 4. Points of interest between the traditional and the new approach to broadly conceived incubation processes.

Approach	
Traditional	Participatory (Regional innovation factory)
Organizations: university top research, science-based firms	Individuals and teams: university students, freelance experts, young entrepreneurs
Knowledge: R&D, IPR	Capabilities: training/mentoring, practices
Science to market, STI	Interactive, problem-driven, DUI, with STI
Closed innovation, exclusive practices	Open innovation, many potential stakeholders
Formal collaboration and legal contracts	Community-based ideals with some formal contracts backing up
Organized activities with occasional “cafeteria effects”	Organized chaos
Business from science and technology	Innovations with creative experimentation
Top-down; “innovation infrastructure first”	Bottom-up; “innovation projects first”
Participation: limited to few groups of stakeholders (“innovation elite”)	Participation: widely distributed including new groups of participants (“democratized”)

By examining the successful cases within both the Technium and New Factory examples there is a tentative conclusion to be drawn about the geographical setting of incubatory approaches, and questions about the relevance of the approach in more rural settings. If we examine the first Technium, in Swansea, began in quite a local-focused manner, meeting the needs of the city by providing a physical space and the support for new high-growth firms and spin-outs, many of which were associated with the local university. The concept worked well in this setting; Swansea is a city of 230, 300 people with two universities (and other further education institutions) and is the second centre of Wales outside of the capital, Cardiff. It compares almost directly with Tampere, a city of 213, 217, which also has two universities and other higher education institutions. Whilst more similar cases would be required to test this hypothesis further it does seem that a network based incubator approach can work well in a smaller city setting with strong interlinkages between universities, businesses, and local residents, and clear governance that can steer a programme in the right direction for the city. In a smaller urban setting like these, the networks are tight and lines of communication between decision makers, planners, entrepreneurs, academics etc. are likely to be good, allowing the different stakeholders to come together in a manner that is constructive and honest. Experience of conducting research in both the Welsh and Finnish setting proves that networks are well integrated and the bottom-up approach is relatively easy to implement.

However, as the Technium case shows, it is a very problematic approach in more rural and sparsely populated areas where the network and demands for such services simply do not exist. The problems in the Technium programme

emerged when it was rolled-out across Wales based on the success of the first centre; whilst the original Swansea centre is still thriving the Techniums in other parts of Wales did not fare so well. The experience of the Technium suggests that these incubator-style approaches may be inappropriate in more rural and peripheral areas with lower population and less businesses to populate the centres; it also seems that having a university located nearby is essential to the success of the centre. We suggest that an important lesson for the Finnish policymakers going forwards is not to attempt the replication of the New Factory in rural settings if the demand is not already there and the networks are not already in place. Instead, if the approach is going to be attempted in such locations, a different conceptualization may be necessary, in close collaboration with local stakeholders and actors to design a variant of the approach that is appropriate to the context, needs, and existing resources.

The “people centred” elements of the New Factory have found to be an important and unique aspect of its success to date. As explained above, the approach to innovation being taken is one that is very much participatory, democratic and community focused. It goes beyond the linear understanding of innovation that it is driven mainly by IPR and R&D often situated within universities, to one that is interactive and evolutionary. We suggest that this people focused approach is much more in line with thinking at the European policy level about “Grand Challenges” and solving big problems through innovation in a more participatory and bottom-up fashion (EC refs). Especially in regions that are suffering from issues of unemployment and slow growth we suggest that this mode could be especially useful. In Wales, this has been an important priority for many years, in light of the de-industrialization of the coal and steel industries thirty years ago. In Finland, it could be increasingly important going forwards, especially in the Tampere region where the strength of the regional economy was driven by, though not completely dependent, on the success of Nokia. This point has a much further relevance to other regions struggling with these issues. A mode of innovation policy that is more entrepreneurial and bottom-up in focus can allow regional policymakers to work with what they already have in their regions, empowering local populations to innovate and take control of their economic futures. We suggest the New Factory model as a means of instilling this approach at the regional level, as part of a broader approach to innovation and economic development. The lesson of the Technium serves to remind us of the importance of retaining the “people” and “community” elements of a programme because when these became lost, the programme began to fall apart.

An important lesson that the New Factory teaches us is one that is very visible to any interested observer of the Tampere region and this is the benefits of a regeneration based approach to incubators, rather than a construction based approach. Of course this insight is very much context dependent, and assumes that there is available and appropriate ex-industrial building stock to be developed, but the wider benefits of this approach, beyond that of saving money, is clearly visible. As well as providing the economic benefits to the companies, entrepreneurs, and researchers involved in the New Factory, the programme is providing a wider service to the city and its residents by re-generating and injecting “local buzz” into the area. Having asserted that a major problem with the Technium programme is that it became too property rather than people focused, it will not do to over-emphasize this point, but it is important to recognize the wider benefit that well designed property approaches can bring to the region rather than creating these “Cathedrals in the Desert” which suck in huge amounts of money and provide little benefit to the local populations.

4.2 Conclusions

If it is assumed, as we do in this paper based on a theory and the two illustrative empirical European cases, first, that participation into innovation activities is expanding at least in many European regions, and second, that instead of overinvestments in heavy innovation infrastructure, economic growth and well-being in mature knowledge economy might be often generated by many non-financial incentives for individuals to use their creativity and skills. It should be considered whether we should broaden the idea of a human from ‘homo economicus’ towards ‘homo ludens’ (Huizinga 1949) when incentives and environments to support the economically feasible use of intellectual capital is promoted. Consequently, we also have to reframe the policy approach, as well as the research agenda of the innovation studies.

What policies, incentives and institutions could be appropriate? What is a sufficient innovation infrastructure? To some extent these questions already have some preliminary answers. For example, several contributions emphasizing the fact that “one size fits all” should not be applied refers that more the same is likely to fail also in building of innovation infrastructure. Further, content of policies, at the level of individuals rather than of macro-structures and groups of institutions should be more carefully designed. This requires more understanding of the local needs, as well as capabilities to apply very specific policy tools in specific contexts. The role of national policy has to give room for the more regionalized and even local approaches.

Alongside the specific lessons and suggestion we can make based on these two examples, there are some wider insights about the nature of innovation policymaking practice and the benefits of cross-region analysis. We argue strongly in favour of this mode of research, and also policymaking, and this paper has illustrated how regions can learn from each other’s experiences in both the positive and negative.

According to Clifton & Diaz Fuentes (2014), for example, OECD’s policy advice and transfer initiatives are not sufficiently funded and followed. Further, policy advices are often on a too general and abstract level or they are even kind of “umbrella” policies rather than detailed examinations of functional and non-functional solutions in certain socio-economic conditions. The detailed benchmarking and case studies may provide at least a partial solution for this dilemma, and ease the search of functional performances with the goal of improving the practices of other organisations (Niosi, 2002).

Whilst the Technium programme has not proved as popular as the Innovation Factory has proved to be, there are a number of useful and important insights that can be drawn from both cases equally. We can learn as much from each other's mistakes as we can from each other's successes. Welsh policymakers were trying to do something new and different in the early part of the new millennium, and it was not overly successful; however, we should praise their vision and effort. They are far from alone in trying to replicate successful incubator approaches across Europe and worldwide, and were following advice from leading regions in doing so. The Finnish case is illustrative of how this best practice from elsewhere can be combined with local capabilities and made relevant to the local context; the combination of borrowing good ideas from elsewhere whilst also taking a "bottom-up" approach to policymaking is recognized as the ideal. It remains to be seen how successful this programme proves to be as it progresses and grows, and the reader is reminded of the Technium's early successes and the later problems it encountered as it expanded.

The regional innovation factory approach is suggested as a more-than-incubator approach to regional economic development and is certainly looking to be a promising and positive style of innovation programme. However, we are not suggesting that it be transplanted wholesale in a one-size-fits-all manner to other regional locations. Indeed, the positive aspects of the approach – its bottom-up nature and community-focus – are unique and totally context dependent.

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Expectations on social innovations by citizen participation in Japan

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Japan has entered the era of “shin-shimin” (new citizens) since around 1990.

This paper aims at identifying some “demand pull” factors as well as “supply push” factors for this transition.

A case of “EbetsuShift Forum” illustrates even university students are becoming active “shin-shimin” (new citizens).

1 The era of shin-shimin (new citizens)

1.1 The era of shin-shimin (new citizens)

Simon Andrew Avenell categorizes phases of civic thought and activism in postwar Japan as, nascent, formative, elaborative and transformative followed by the era of shin-shimin (new citizens) from around 1990.

Table 1. Phases of civic activism in postwar Japan.

Phase	Movement	Identities
Nascent	Cultural circle activism Ca 1945-55	The people
Formative	The Anpo struggle 1958-60	Shimin
Elaborative	Beiheiren 1965-74	Shimin as Japanese and Asians
Elaborative	Antipollution and Antidevelopment Protest (ca 1964-75)	Shimin as jumin (local residents)
Elaborative	The movement for citizen participation (ca 1963-75)	Shimin as kokumin (Japanese nationals)
Transformative	The new civic movements (ca 1975-89)	Shimin as seikatsusha (inhabitants of daily life)
?	The rise of civil society (ca 1990-present)	Shimin as shin-shimin (new citizens)

(source: p. 241, Avenell, S.A (2010): Making Japanese Citizens –Civil Society and the Mythology of the Shimin in Postwar Japan. University of California Press)

The shin-shimin is regarded as a self-reflexive, self-responsible subject open to collaboration and engagement with traditional opponents, all in the name of fundamental social change. (Avenell, S.A 2010, 251)

1.2 Seven factors for the rise of shin-shimin

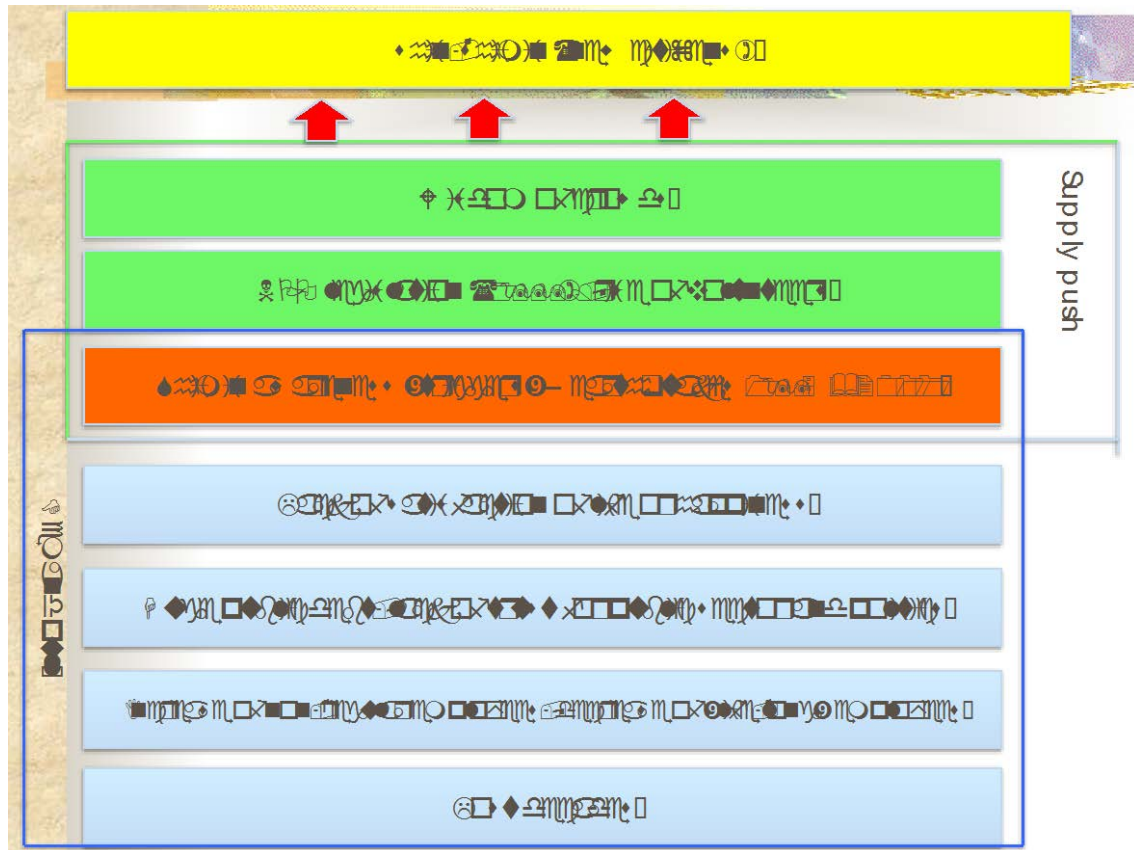
Below is a trial to analyze and identify 7 factors for the rise of shin-shimin from demand-pull and supply-push sides.

1. Japan’s “lost decades”
2. Increase of non-regular employees, decrease of “life-long employed”
3. Huge public debt, lack of trust for public sectors and politics
4. Decreasing satisfaction of life or happiness

5. Shin-shimin awareness “triggers” - the earthquakes in Kobe (1995) and in East Japan (2011)
6. NPO legislation (1999) and boom of volunteers
7. “Wisdom of crowds”

1–5 can be regarded as “demand pull” factors while 5–7 can be seen as “supply push” factors for the rise of the civil society or shin-shimin (new citizens)

Exhibit 1. Demand-pull and supply push factors for shin-shimin.



1.2.1 The lost decades in the Japanese economy

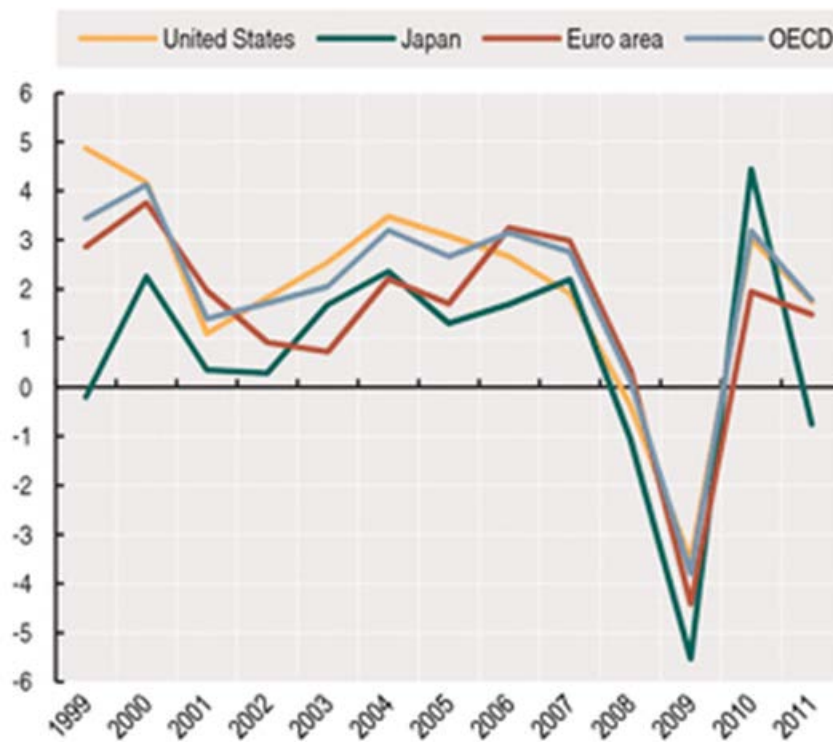
The Japanese economy since the beginning of 1990's is often described as “The lost decades“. There are many evidences for this description.

GDP per capita in Japan was one of the highest in the world at the beginning of 1990's but was down to the 18th to 19th in 2006-2008, and 25th in 2013. (World Bank online)

Japan's share of world's total GDP was 17.7% at the peak (1995) , which is now down to 8%(2007) and 5.4% (2013).

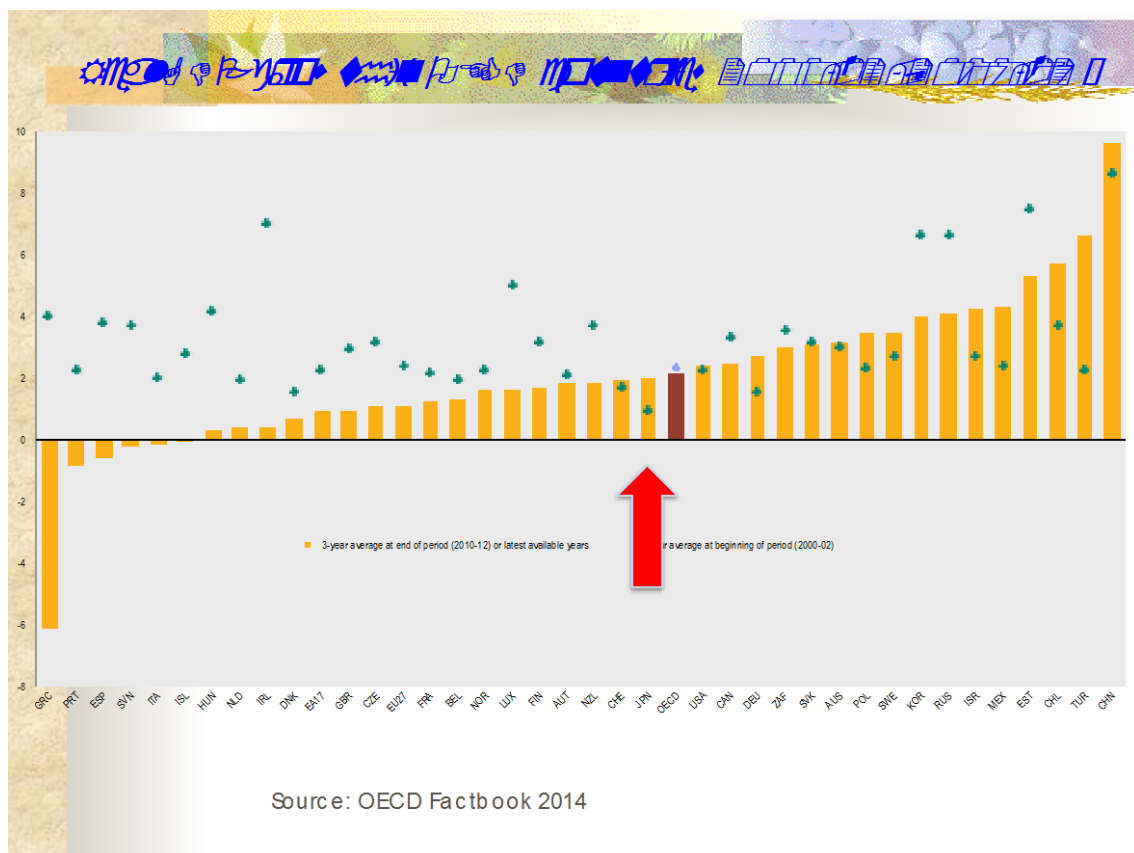
IMD's world competitiveness yearbook's rankings of Japan showed a steady decline from No. 1(1991-2) to 24th(2007), 22nd (2008) ,17th(2009), 27th(2010) and 21st(2014).

Exhibit 2. Annual GDP growth 1999–2011.



source: OECD Factbook 2014

Exhibit 3. Real GDP growth in OECD countries 2000–02, 2010–12.



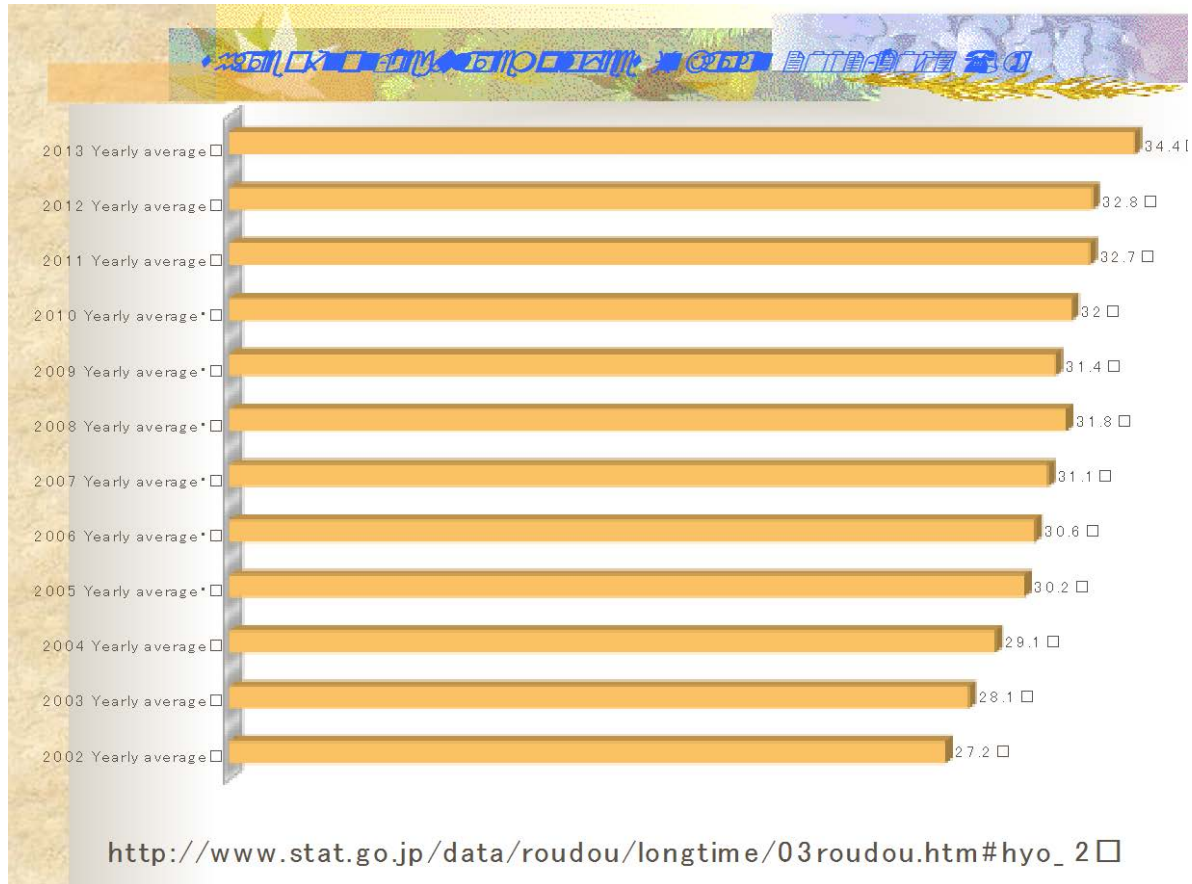
Source: OECD Factbook 2014

1.2.2 increase of non-regular employees, decrease of "life-long employed"

Japanese labor market became well-known with "life-long employment" after the World War II.

This structure is however changing rapidly during the lost decades and the share of "non-regular" employees are increasing as the exhibit shows.

Exhibit 4. Share of non-regular employees in Japan 2002–2013 (%).

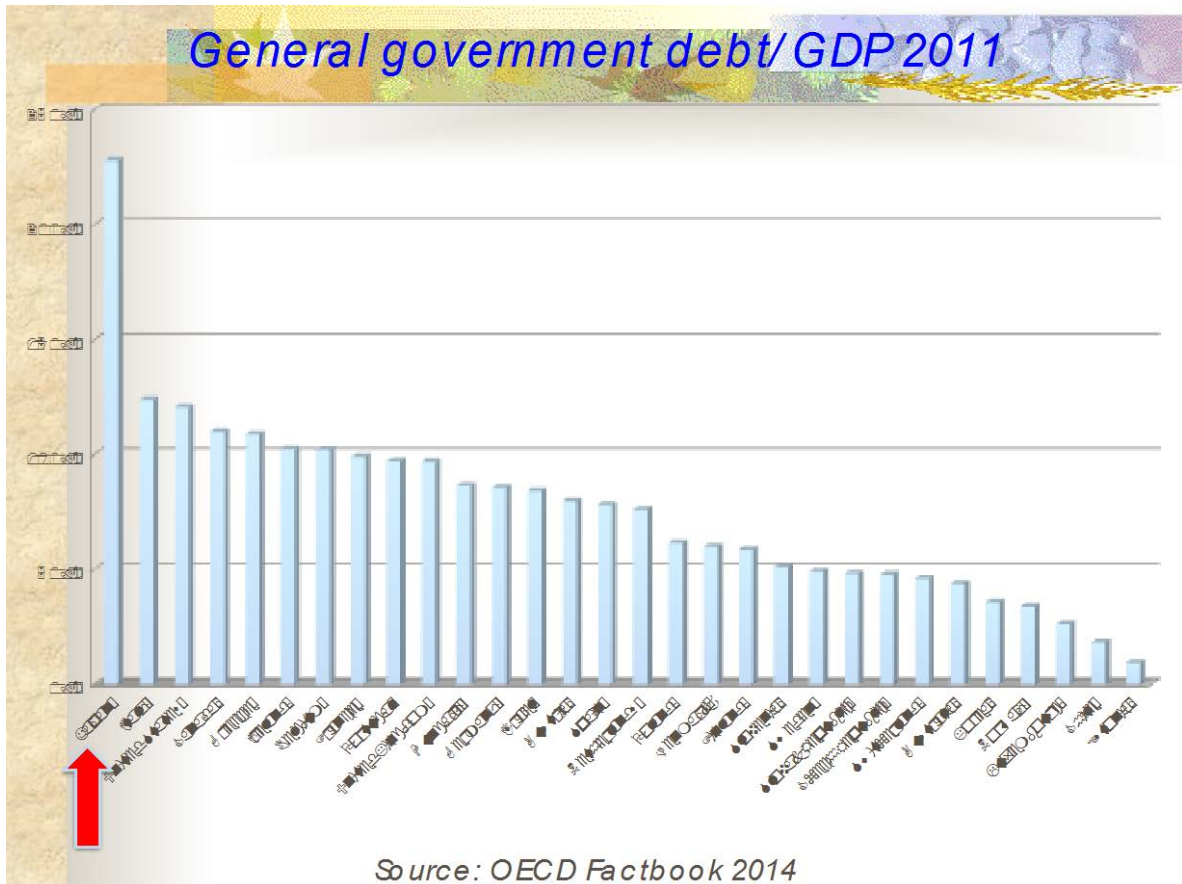


1.2.3 huge public debt, lack of trust for public sectors and politics

Public debt of the general government in Japan as compared to GDP is by far the highest among the OECD countries.

Situations are similar even for local municipalities. Not to mention Yubari, a city on Hokkaido, most northern part of Japan that went bankrupt in 2007, most municipalities and governments have less possibilities for policy measures than before.

Exhibit 5. General government debt/GDP 2011.

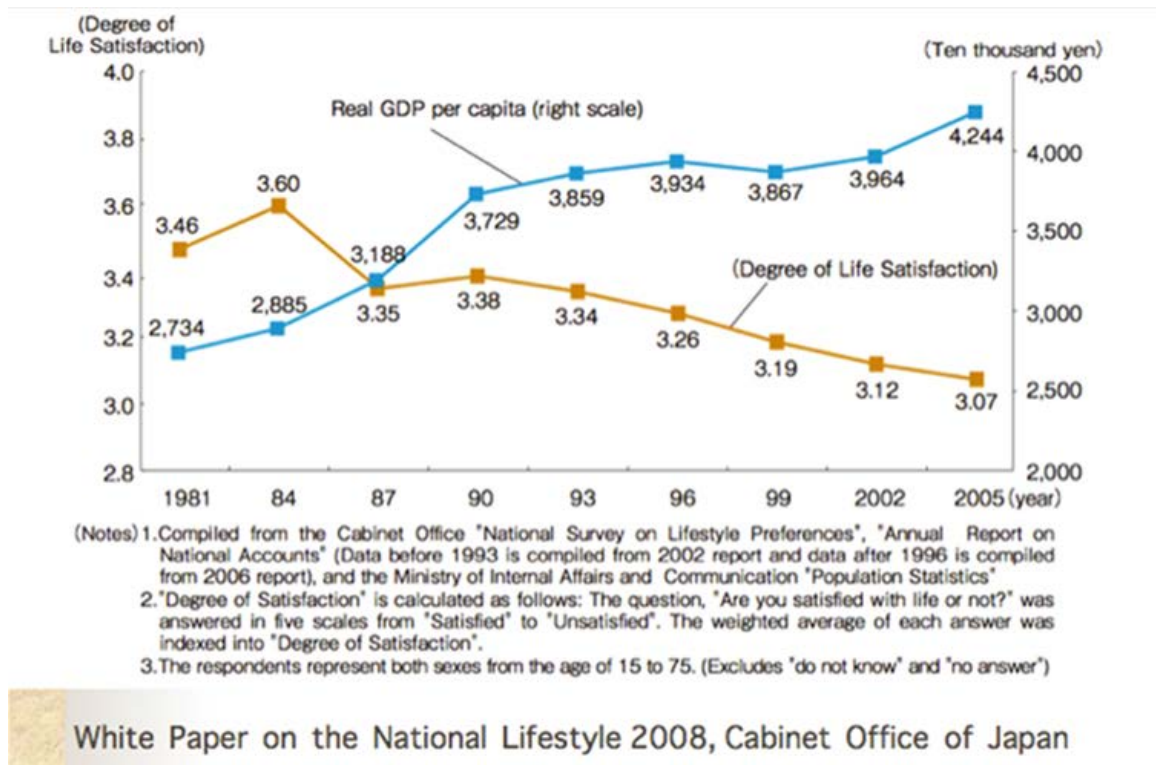


1.2.4 decreasing satisfaction of life or happiness

Easterlin paradox or paradox of happiness is applicable even in Japan as the figure shows. (Easterlin, 1974)

In recent international comparisons by OECD (How's Life?) or World Happiness Report, rankings of Japan are around 20th. or 43rd.

Exhibit 6. The degree of life satisfaction does not increase in Japan.



There are active ongoing debates on happiness in Japan.

Major points of discussions are that it is not money or material things that make people happy but rather 1) feeling good, 2) engaging fully, and 3) doing good as positive psychology points out. (Siegel R, 2011)

Many feel good and happier for example by engaging or volunteering fully for others and for the society.

1.2.5 Shimin awareness "triggers" - the earthquakes in Kobe (1995) and in East Japan (2011)

The Great Hanshin Earthquake (January 17, 1995) took more than 6,000 people's life.

The Great East Japan Earthquake (March 11, 2011) with tsunami caused loss of nearly 16,000 people and the meltdowns of the nuclear power stations in Fukushima

These earthquakes and disasters are regarded as triggers for shimin awareness by many researchers. They offered concrete realities to act and help the victims. Many companies and universities offered possibilities to take off for volunteer works to help the victims.

Persons who took part in volunteer work in the areas affected by the disasters increased to 4.3 millions in 2011, three times more than in 2006. (Ministry of Internal Affairs and Communications)

1.2.6 NPO legislation (1999) and boom of volunteers

After the Great Hanshin Earthquake, NPO (non-profit organization) legislation was introduced in Japan in December, 1999 and the number of registered NPOs has been increasing as the exhibit 7 below.

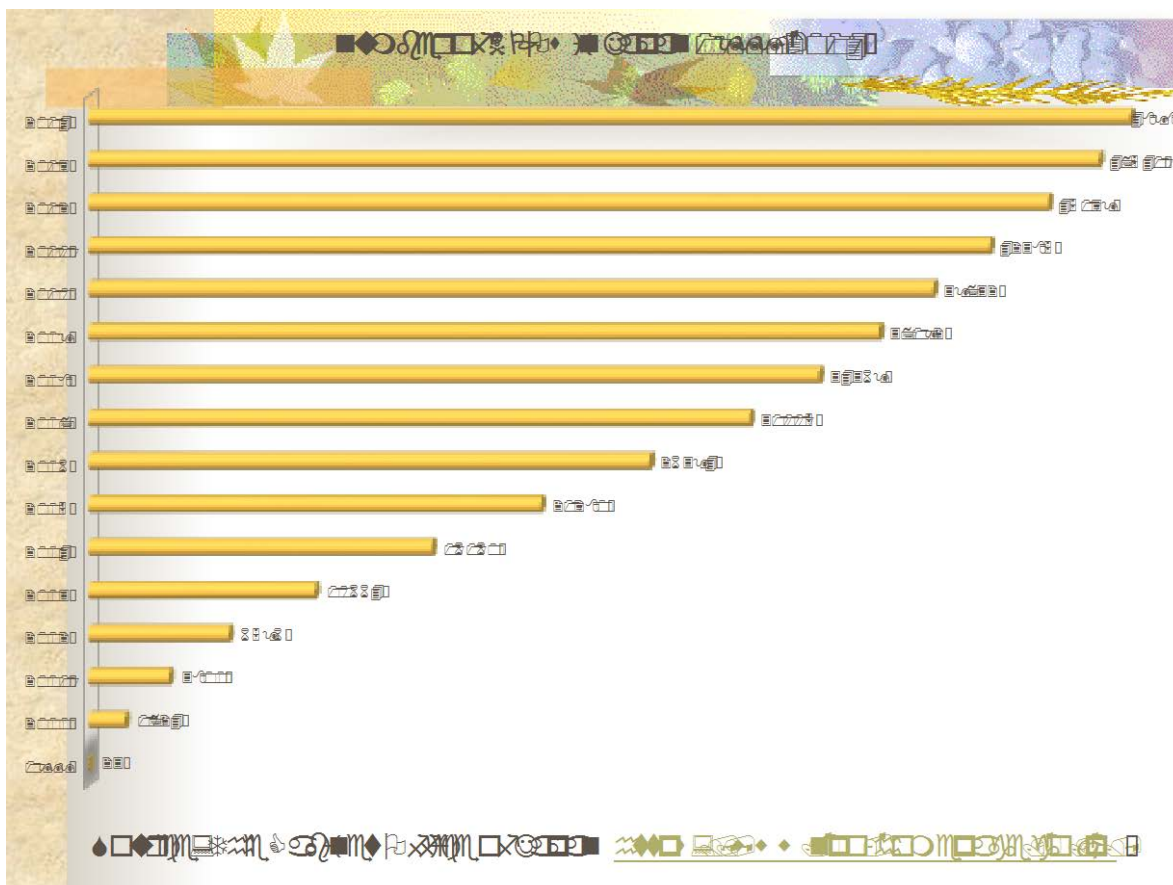
Areas of volunteers activities cover on health, for the aged, for the handicapped, for children, on sports, culture, art and science, for regional development, for safety promotion, for sustainability, disaster related activities and so on. (Cabinet Office of Japan, 2014)

Volunteers and NPOs are surely some symbolic indicators of civic society, citizen participation and democracy.

However, Japan has much to catch up with compared to the many nations in the West. For example, Sweden which has only 7% of population in Japan, has some 200,000 NPOs and 86% of all citizens between 16 and 84 years old are members of NPOs. (SCB, Undersökningarna av levnadsförhållanden, 2008) Nearly half population (16-74 years old) has taken part in volunteer work during the last 12 months in 2009. (Svedberg L., 2010)

Pro bono (being, involving, or doing professional and especially legal work donated especially for the public good), social entrepreneur, parallel career, "Altruism driven economics" (Tateoka, 2006) are some key words that attract especially younger Japanese workers.

Exhibit 7. Number of NPOs in Japan 1999–2014.



1.2.7 “Wisdom of crowds”

There are increasing numbers of citizens who take part in different public discussions in Japan.

One reason might be the trust for “Wisdom of crowds” (Surowiecki 2005), instead for “wisdom of experts or specialists” (Nishigaki, 2013). Especially after the meltdowns of nuclear power stations in Fukushima, trust of Japanese for experts or specialists has decreased radically. Their argument is that experts are good when the problem is identified, while much of the current problem handles about to find out and identify the problem. Then “wisdom of crowds” must take part in.

Most of municipalities invite citizens to take part in policy discussions actively.

Seminars and workshops on facilitations or coaching to make it easier for citizen participations are very popular and attract many.

2 EbetsuShift Forum - a case of students’ initiative

Activities of shin-shimin (new citizens) are rising in many areas of life and policies as mentioned before.

This part takes up a concrete case by university students to illustrate movements of shin-shimin are affecting even students.

On Sunday, March 13th, 2011, an event named EbetsuShift Forum (<http://ebetsushift.jimdo.com/>) was held in Ebetsu, a adjoining city to Sapporo in Northern Japan. It was only 2 days after the Great East Japan Earthquake with tsunami and the meltdowns of the nuclear power stations in Fukushima.

EbetsuShift Forum’s main guest was Prof. Akira Suzuki, Nobel prize lauriate in chemistry and was organized by some 50 students from Sapporo region.

I had a course at a Rakuno Gakuen University in Ebetsu in 2010/11 semester on regional development and then the news came in that prof. Suzuki, resident in Ebetsu will receive the Nobel prize.

The students wanted to organize a seminar with prof. Suzuki as a main guest to discuss on regional development and vitalization of Ebetsu City.

It was not so easy though. Among others prof. Suzuki became a super star in Japan and was much occupied with speeches and other engagements. He did not have time simply.

The strategy of the students was then to invite the Swedish ambassador in Tokyo also that might give some pressure to prof. Suzuki.

This strategy worked out and prof. Suzuki promised to join the forum with the Swedish ambassador Stefan Norén.

Ebetsu city has a population of 120,000 and has a character of an “academic” town with not less than 6 universities and colleges with 12,000 students totally.

More than 45 students from 7 universities in the Sapporo region formed an organizing committee for “EbetsuShift Forum”.

The forum got much attention from the media and was carried out successfully with a total of more than 200 participants.

The program consisted of 2 parts.

Part 1: presentations by students followed by a “world café” on regional development in Ebetsu

Part 2: Discussion on future of education with among others prof. Suzuki.

According to an evaluation survey of the participants, they were much impressed by the initiatives and achievements of students and satisfied with the conference. Many participants looked forward to the continued session to come. Even if it was the dark period directly after the disaster, many saw the light in the future by the power of young students.

Below is an example of voice of a participant.

-Much impressed by the power of students. Want to continue to discuss more. I can see the future of Japan more positively now.

Impressions by the students are below.

“I have never been so much excited as this event before in my whole life. Very nice to know that participants could value our efforts. EbetsuShift Forum became an unforgettable experience for me.” Kazuki Yamada, chairperson of the organizing committee.

“It was not so easy to organize and lead nearly 50 students. But the positive evaluations by the participants gave tears in my eyes and I am much satisfied with the results we could attain.” Rina Noguchi, vice chairperson of the organizing committee.

I was also much impressed by creative powers of the students and am confident that the efforts and the experience gave them self-efficacy.



Exhibit 8. presentation by students.



Exhibit 9. world café on regional development.



Exhibit 10. discussions on future education with prof. Akira Suzuki, Nobel prize lauriate.



Exhibiti 11. Rina and Kazuki, chairpersons of the organizing committee.

Exhibit 12. EbetsuShift proposal by Ms Kazuki Hayashi, member of the Ebetsu City Council.



Exhibit 13. group photo of the satisfied students with prof. Suzuki after the seminar.

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Visualization of services - Closing expectations gaps and increasing service quality

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The Paper presents a solution to eliminate any possible expectation deficits on the client side within the delivery of services by using visualization methods. The existing options for services are screened within a literature review in service management and, afterwards, reflected with experts from the Facility Management sector. In referring to these results, a method will be presented which supports a continuous exchange of information within services and hybrid bundles of services in specific. Using the example of the planning process of real estates as hybrid value creation, a service visualisation which makes the planning process more transparent to the customer and the other stakeholders is presented.

1 Introduction

Service industries play a progressively essential part in our overall economy (Kellogg & Nie, 1995). However, the wealth of visualization and planning methodologies and tools available in manufacturing industries is not as abundant in the service sector. Many new services fail to realize their objectives, which could result in customer dissatisfaction with potential long-term consequences (Smith, 2007), due to the fact that important dimensions of service processes are often missing or, at best, only vaguely implied (Kellogg & Nie, 1995). Furthermore, as numerous researchers have indicated, direct application of concepts and methods developed from the manufacturing arena to the service sector is inadequate. Service production encompasses all processes necessary to deliver a service, including customer interaction, management activities and service production operation (Fließ & Kleinaltenkamp, 2004). Therefore, the use of product-based models and language to define and manage service businesses confines thinking in a way that limits innovative management approaches. In addition, layout issues are more complex than in the job shop of the manufacturing arena as one must also examine the customers' movement and contribution in the service process (Kellogg & Nie, 1995).

In addition to this, the procurement of services entails uncertainty for customers due to the heterogeneity and immateriality of services, which are intangible activities designed to achieve a certain range of desired outcomes (e.g., technical, informative, and knowledge-related activities). It is not obvious to the customers what they will receive for their money before the service purchases (Bernhold, 2010; Meyer, 1991; Lasshof, 2006). Likewise, there is a difficulty for the service provider to market their services without the possibility of presenting the final product. The intangibility surrounding a service makes it hard to set standards (Lim, Kim, Hong, & Park, 2012) and complicates the conventional management tasks of designing, constructing, conducting and controlling the performances which go into creating a service (Kingman-Brundage, 1989). In addition, because of the intangibility of many results, perceptions and potential gaps between perception and reality are more significant issues in services than they are in products (Lim, Kim, Hong, & Park, 2012). Expectations are complex and dynamic notions that are affected by an array of aspects. Initial expectations set the thresholds that will determine whether disappointment, satisfaction or delight results from an encounter. Research shows that when assessing quality of process and result, customers have a 'zone of tolerance' between their expectations and what they perceive they are receiving. The zone of tolerance is very narrow after initial service failure (Harvey, 1998). Since customer satisfaction is measured inversely by the gap between expectations and perceptions, attracting customers with lofty prospects that cannot be met, will result in disappointed customers, frustrated servers, and negative word-of-mouth that will repel prospective customers (Harvey, 1998). Additionally, customer satisfaction has a substantial effect on follow-up services, or possible long-term partnerships, which can have advantages for both parties. Thus, clear communication and close cooperation between marketing and operations is pivotal to success (Harvey, 1998). One possibility to avoid the disconfirmation of satisfaction is to integrate the customer into the service process very early on, or to show them the service configuration before its procurement. At the same time, the presentation of service results is needed at the beginning of the delivery process. Therefore, it is important to reduce information asymmetries associated with the service procurement to reduce uncertainties in service procurement for both sides. It should be obvious to the service provider that the customer is an important and active element in the value chain and that their needs and expectations also have influence on the service result (Lasshof, 2006; Chase et al., 1983).

In this paper, the described problem is examined more closely using Facility Management (FM), an innovative service sector, as an example. Property-related services, as a form of hybrid value creation products, include the realization of individual customer requirements and solutions within the planning, building, and operation of real estates. In this context, a broad variety of stakeholders are involved (planners, architects, engineers, client, users) and should be integrated in a life-cycle-wide planning process to ensure that the potential of hybrid value creation can be implemented during subsequent lifecycle phases. Due to the complexity of such product-services combinations and the integration of different stakeholders, the transparency of the building planning process is insufficient and optimization

potentials are not apparent. According to this, there is a need for simulation tools that make the processes and outcomes more transparent for the participants. Therefore, the following paper contains a literature review of prospective solutions for the given problems and a critical reflection of these findings within the Facility Management domain. As a result, different approaches for service visualization are regarded and one is explained in more detail which is also used as a basis for developing an information-system-based reference model.

2 Theoretical Background

2.1 Facility Management

Facility Management (FM) is a management discipline which focuses on the economic use of facilities and real estates. Therefore, related services for meeting the company's needs in the working environment are in the scope of FM, which contains the management of support processes to enable the company's core activities. In doing so, worker's environmental needs are satisfied by simplifying their tasks, whilst the return on investments in facilities and real estates is increased throughout the real estate lifecycle time. Therefore, FM includes permanent analysis and optimization of cost-based activities related to technical facilities, buildings, and internal processes that are not related to the core activities of the company (GEFMA 100-1, 2004). In its European standard, FM is considered as the combination of multiple processes within a company into services that allow companies to more efficiently improve their primary activities:

In general, all organizations, whether public or private, use buildings, assets and services (facility services) to support their primary activities. By coordinating these assets and services, using management skills and handling many changes in the organisation's environment, Facility Management influences its ability to act proactively and meet all its requirements. This is also done to optimize the costs and performance of assets and services (DIN EN 15221-1, 2007).

The German Facility Management Association differentiates nine real estate lifecycle phases; each of these phases contains different facility services. Figure 1 gives an example of some facility services.

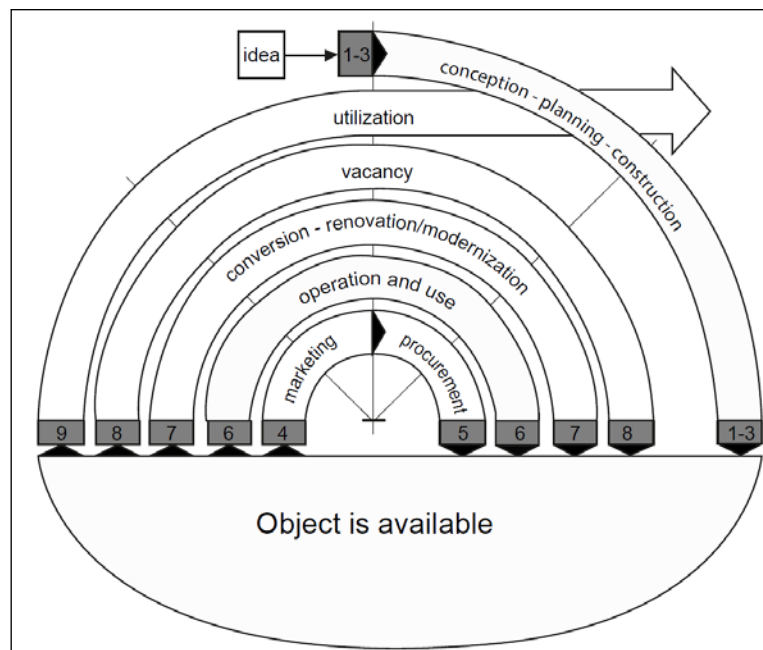


Figure 1. Life cycle phases in FM (GEFMA 100-1, 2004).

What is special in FM is the economic analysis of property from the aspect of lifecycle costs. In this context, the FM-focused planning plays an important role, since the life cycle costs, of which the usage costs account for the largest part can be minimized by user-based planning. FM-focused planning, therefore, pursues low construction costs in combination with high quality and a reduction of the life cycle costs. In order to accomplish this, numerous stakeholders have to be involved in the planning process and responsibilities and competences have to be determined for a controlled process.

2.2 Hybrid Value Creation in FM

Hybrid products represent complex problem solutions which consist of material products and immaterial performances by integrating goods and services. The target solution determines the contingent goods and services which have to be used and matched (DIN PAS 1094 2009). Hybrid products require the integration of the external factor, in this case the customer, in a high degree. In Facility Management benefits in kinds and services are inseparably interconnected. In order to achieve competitive advantages, planning, construction and operation of buildings cannot be carried out isolated from each other. Products and services are adhesive in consideration of information demand. For instance, planning documents are needed for the planning and control of the maintenance process. On the other hand, experience made in operation of current used constructions and systems as to maintenance intensity or fault liability of the product can be integrated in the planning (Bernhold, Nitzsche, Rosenkranz 2008). The potentials of hybrid value added are particularly used in mechanical engineering. Along the lifecycle of benefits in kind numerous services are provided for customized problem solving's, e.g.: Phase before using: funding, engineering and consulting; utilization: maintenance and operation; subsequent use: disposal, remarketing and recycling (McAloon 2006; Spath, Demuß 2006, Sturm, Bading 2007; Aurich et al. 2007; Leimeister, Glauner 2008).

Hybrid value added in Facility Management hold the challenge to involve multifaceted stakeholders along the whole lifecycle of a building: architects, professional planner, constructor, craftsmen, owner and Facility Manager (Schäfermeyer, Rosenkranz 2008; Pfnür 2011). It is a challenge to integrate all these players in such a way that an external factor, here the customer, can follow the process. Oftentimes, agreement and transparency of what information from which player has to be exchanged do not exist. However, the broad integration of all stakeholders is the requirement for the realization of complex and innovative service offers.

2.3 Customer Satisfaction and Service Quality in Service Delivery

In order to achieve high service quality and to find a customer-orientated problem solution, it is important to focus on customers and their satisfaction with the service experience and the final service result. Therefore, customer satisfaction can be defined from different viewpoints which highlight either the process or the service outcome (Hahn, 2002).

One of the most prevalent models for the evaluation of customer satisfaction is the customer satisfaction / dissatisfaction (CS/D) model which defines customer satisfaction as the "outcome of a complex information processing process" (Herrmann et. al., 1997). According to this model, customers evaluate their satisfaction by comparing the subjectively perceived performance of the product or service with the performance they expected before the product or service was bought (Vavra, 1997; Gerson, 1994). Therefore, the expected result can be either confirmed or disconfirmed by the perceived result. In the case of disconfirmation, the perceived result can be either better than the expected result (positive disconfirmation) or worse (negative disconfirmation). The latter leads to customer dissatisfaction, whereas the confirmation of expected results and positive disconfirmation generate satisfaction (see Figure 2).

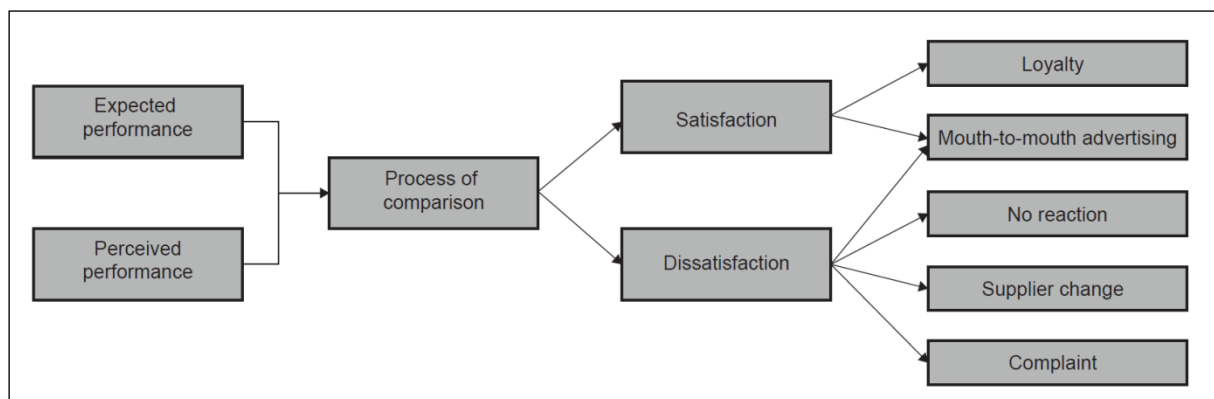


Figure 2. Customer satisfaction / dissatisfaction (CS/D) model (compare Homburg/ Stock, 2003; Hahn, 2002).

Different consequences from satisfaction or dissatisfaction can be derived. For example, loyalty from satisfied customers who tend to repurchase a product or service, or word-of-mouth advertising in the case of recommendations to potential buyers. Conversely, dissatisfied customers may also have a negative impact on word-of-mouth advertising, become inclined to change suppliers, or express their dissatisfaction in the form of complaints (Hahn, 2002).

Pertaining to services and the intangibility of their results, it is difficult to align the service quality and the consistency of services with respect to customer requirements (Meyer, 1991). This is a challenging task for service providers because services are sold before their delivery. That means customers face uncertainty about what to expect from service results. Service providers are also confronted with the insecurity of not knowing how to satisfy customers' needs and expectations in a sufficient way. To some extent, customers do not even know what they are expecting or what they really need for solving their particular problem or rectifying their individual needs. This can also lead to

dissatisfaction with the delivered service although it was carried out thoroughly. Several studies have shown that quality plays a large role in achieving customer satisfaction (Zeithaml et. al., 1988; Bolton & Drew, 1991). The SERVQUAL model, also referred to as the GAP Model, by Parasuraman et al. (1988), for example, identifies five different service gaps which are related to the concept of service quality and factors affecting it (Parasuraman et al., 1985). With regard to the customer perspective in service delivery, there is, for example, a discrepancy between the executive perception of the service provider and the consumer perception, whereas the service provider may not always understand what their customers are expecting. In addition, even if the specifications meet customers' requirements, there may be another gap between the service specifications and actual service performance, because it is not of high certainty due to the human factor in delivery (for more see Parasuraman et al., 1985). The expectations of customers are also dependent on their former experiences or what advertising or communication they receive. Therefore, Parasuraman et al. state that service quality is the result of the consumer's comparison of expected service and actual perceived service (see Figure 3).

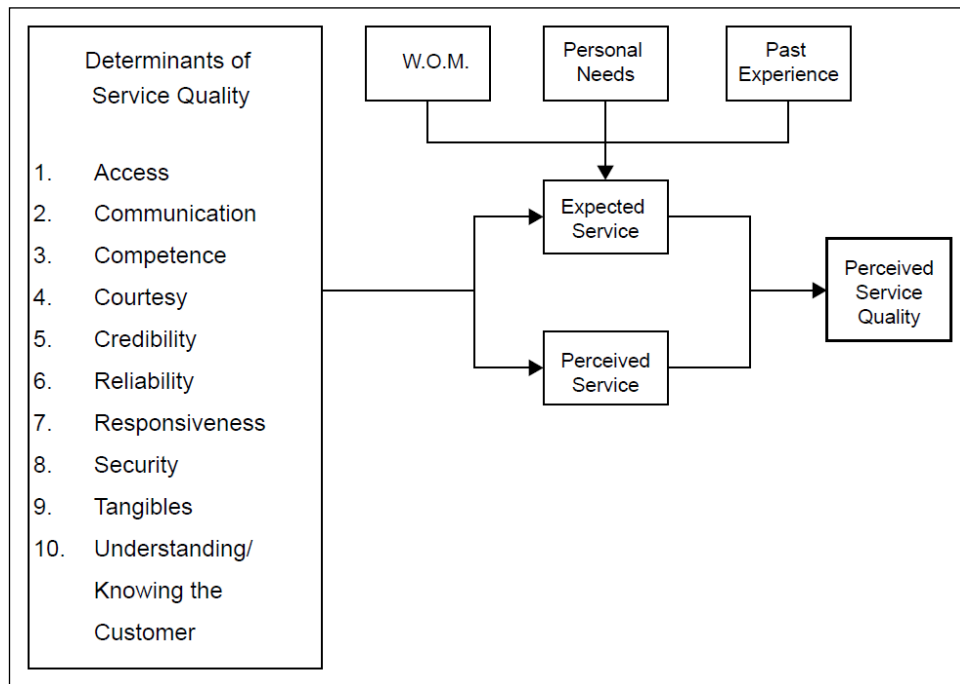


Figure 3. Determinants of perceived service quality (Parasuraman et al., 1985).

With regard to the importance of customers' expectations and its linkage to customer satisfaction or perceived service quality, it is necessary to be aware of what customers expect. It is also of high relevance to manage those expectations in order to raise customer satisfaction and customer perceived quality to accomplish opportunities of economic success. Customer expectations can be influenced, for example, by understanding the customers' point of view or identifying their needs, by coordinating corporate communication strategies, or by increasing transparency of service processes so that expected results match the actual service results (Bidmon, 2004; Richter, 2005).

3 Methodological Approach

The scope of the investigation is to identify potentials for increasing the transparency of service results with respect to FM-focused planning which results from hybrid value creation in the planning process and its challenges. With respect to an extensive cooperative planning, the coordination work should be reduced and it has to create transparency between different stakeholders by means of visualization approaches. The study aims to identify visualization options for service processes especially to customers. In line with this, the definition of "visualization" was analyzed in more detail and available implementation options for creating transparency in services were investigated. Next, information and processes that must be provided to the customer at the beginning of services were outlined using the case of FM-focused planning. The aim was to show new perspectives for hybrid value creation with regard to service processes in construction planning and Facility Management. Consequently, potentials for service visualization were initially investigated in practice in order to identify the research gap in more detail and to gain insights in practical service business. This was realized by conducting interviews with experts from the Facility Management sector with the objective of defining the status quo regarding their experiences. The interviews also served to investigate how to deal with customer expectations and service providers and to determine whether there are already management tools in use in practice.

Secondly, a literature review of selected documents was carried out. By means of qualitative content analysis, the various theories, methodologies, and definitions of service visualization were identified and categorized. Conceptual constructs were then refined in an attempt to explain interactions between the categories. By critically noting the

explicit or correlational linkages between individual concepts, and the multiple instances they are supported in the data, inferential statements were created. This enabled the drawing of conclusions and the development of implications to the Facility Management sector. Based on these findings a method has been developed for the visualization of services in a FM-based planning process which is divided into three levels with different detailing depths and scopes of visualizations. The following table summarizes the research process briefly.

Table 1. Research design.

Research steps	Used methods	Purpose and justification of used methods
Definition of research question	Problem focused interviews	<ul style="list-style-type: none"> • Specification of the research topic
Identification of state of the art	Literature review	<ul style="list-style-type: none"> • Examination of status quo • Identification of potentials for service visualization • Definitions of relevant terms • Understanding of customer experiences and related terms • Identification of methods used for the management of customer experience
Problem solution	Method development	<ul style="list-style-type: none"> • Problem focused solution • Management approach for customer experience through service visualization (e.g. service blueprinting) • Method development for visualization of services

4 Results/ Findings

4.1 Perception

As already mentioned, the customers' experience of a service is elementary for their satisfaction. Therefore, interviews with experts from the Facility Management domain were arranged to acquire an idea of how to gain experience before a performance is provided. Based on the assimilated requirements of the interview partners, a definition of "previous experience" was developed. Generally, an experience is something that happened in the past. Past experiences can be used for designing and upgrading future processes. In building planning phases, the experience of the results is gained in form of plans (drawings) and communication. An absolute experience of a building and the services in it is only given in the operating phase after the building is constructed. This is because the building can be experienced with all senses; namely, seeing, smelling, hearing, feeling. The experience grows with the lifecycle of a building. Moreover, experience is subjective and every stakeholder in a project has a different view. To minimize the subjectivity, communication and the exchange information are fundamental.

In summary, experience is the feasibility of gathering data and information and processing them in the brain. Data acquisition and processing are influenced by various environmental conditions. For this reason, experience is always partially subjective. The more complex a process is, the more important the feasibility of experience is to reduce the subjectivity. Hence, an easy solution is needed to bring all stakeholders to the same level of experience as much as possible. In the next step, one potentiality in the form of visualization processes is given.

4.2 Visualization

"Every problem solving effort must begin with creating a representation for the problem" (Simon, 1996; Lim, Kim, Hong, & Park, 2012). Visualization assists humans in competently building and using their mental model. Visualizing a complex yet invisible system helps people comprehend and analyze it (Lim, Kim, Hong, & Park, 2012). A visual representation provides an insight of the various strategic choices available (Kellogg & Nie, 1995). In addition, it can facilitate 'tangibilizing' and conceptualizing the aspects of a service and how they relate to the service as perceived by consumers.

As well, it can provide a valuable mode of communication and coordination throughout the service delivery process (Smith, 2007). This can considerably enhance dialogues between the people involved in discussion, allowing them to achieve mutual understanding more efficiently and effectively (Lim, Kim, Hong, & Park, 2012). Establishing a generic visualization facilitates an augmented and shared understanding by clearly communicating the interfaces, leadership and organization challenges. It enables a joint and shared holistic understanding of complex, support contracts. Thereby, it encourages co-creation of improved value between providers and clients (Mills, Parry, & Purchase, 2011). The design

of a service should, therefore, integrate the instrumentation of tangible evidence; that is: everything the consumer uses to verify the service's effectiveness (Shostack, 1984).

Visualization presents systematic means to help those who design services ensure that they meet customers' requirements. Every service system and service action has to be devised both in terms of satisfying technical quality and the perception of quality by customers. Service visualization helps to translate the dimensions of quality into service specifications and standards (Harvey, 1998).

For all the subjectivity and immateriality of services, service design and services operations necessitate discipline, procedures, standards and attention to details in order to function effectually and efficiently (Harvey, 1998). However, the development of a new service is typically defined by trial and error. Developers interpret a subjective description of a need into an operational model that may bear only a distant similarity to the original idea. This leaves ample opportunity for conflict, inefficiencies and poor decision making (Smith, 2007). In the absence of a detailed design, there is no way of guaranteeing quality or conformity (Shostack, 1984).

Better service design affords the key to market success, and more importantly, to growth (Shostack, 1984). This is because it highlights main decision points, important criteria and the demand for active control measures in the service design. What is more, it provides a foundation for continuous improvement and service re-design, thereby providing a platform for future new services and opening opportunities for repositioning and overall strategic development such as diversification, new market entry etc. (Smith, 2007). Thus, if a way can be found to illustrate the service system concretely, the service management task is not only simplified but important elements of control are gained as well (Kingman-Brundage, 1989).

4.3 Service System Blueprint

The most prevalent service-specific representation is service blueprinting (Mills, Parry, & Purchase, 2011). Created by Shostack and developed further by Kingman-Brundage to visualize service processes (Fließ & Kleinaltenkamp, 2004), service blueprinting derives its technique from systems approach and industrial engineering. In the simplest terms, a service system blueprint is a picture of a service system (Kingman-Brundage, 1989). Thereby, it is more exact than non-visual descriptions and less prone to misinterpretation as it is quantifiable and non-subjective (Shostack, 1984) (Smith, 2007).

4.3.1 Applications of Service Blueprinting

Service system blueprints have become a keystone of the studies on service design, evaluation, development, and operation (Lim, Kim, Hong, & Park, 2012). As a heuristic method for analyzing and planning service processes (Fließ & Kleinaltenkamp, 2004), it offers managers and system designers with a reliable, practical tool for simplifying the most complex service systems by displaying the operation of existing systems (Kingman-Brundage, 1989). The main applications of this visualization have been in the consumer markets of hospitality, retail and banking (Mills, Parry, & Purchase, 2011).

Service blueprints can be used as either a design tool or a coordination tool (Fließ & Kleinaltenkamp, 2004). In addition to helping designers and managers recognize potential glitches, it is a great communications instrument to clarify contingency plans (Harvey, 1998). By relating particulars of a service in a way that is intelligible and effectual, the different parties concerned in the service system are able to understand and deal with it objectively regardless of their roles or individual point of view (Kingman-Brundage, 1989; Fließ & Kleinaltenkamp, 2004).

The advantages of service system blueprinting lie in the method's aptitude in disclosing what is currently implicit. In that way, it can be used as a basis for development of consumer resources geared to reveal the "invisible actions" (i.e., those performed backstage or even in support areas) taken on the consumer's behalf to ensure service quality (Kingman-Brundage, 1989).

4.3.2 The Framework of a Service Blueprint

A service system blueprint illustrates the details of service delivery by answering this question: Who Does What, To Whom, How Often, and Under What Conditions? (Kingman-Brundage, 1989). Essentially, it depicts the process and structure of a service system by utilizing the horizontal and vertical dimensions of a flat surface. Process is shown from left to right on the horizontal axis as a series of actions (rectangles) plotted chronologically. A flow line represents the service path by connecting discrete actions carried out by the customer and the service provider. Service structure is represented on the vertical axis as structural layers. The vertical axis distinguishes between different areas of actions (Kingman-Brundage, 1989; Harvey, 1998; Fließ & Kleinaltenkamp, 2004).

The primary structural strata, or action areas, are common to all services: consumer interaction, support functions, and management. Within these three primary sections, finer distinctions can be made (Kingman-Brundage, 1989). They are separated by four horizontal lines:

1. *Line of Interaction* which separates the customer action area from the supplier action area representing the direct interactions between customer and supplier. Above the line are the activities, choices and interactions performed by the customer. Actions performed by contact personnel are located below the line.

2. *Line of Visibility* differentiates between actions visible to the customer (onstage) and invisible to the customer (backstage). Onstage (front office) actions often represent the tip of the service iceberg.
 3. *Line of Internal Interaction* distinguishes between front office and back office activities, separating support functions from the backstage, contact stratum. Support processes, which are necessary to provide front office employees in delivering the service, are carried out beneath the line.
 4. *Line of Implementation* separates planning, managing and controlling functions (management zone) from the “doing” activities (support zone). Activities in the management area also take place while the service operations are conducted.
- (Smith, 2007; Fließ & Kleinaltenkamp, 2004; Kingman-Brundage, 1989)

4.3.3 Limitations of Service Blueprinting

Performance is the unit of analysis in a blueprint and is defined as the series of activities, or tasks, undertaken in rendering a service understood to be an instrumental interaction. In this manner, service blueprints are task-oriented; they focus on observable actions or events. While this is greatly beneficial in facilitating the customer’s understanding of the service delivery process, it is incapable of portraying to the customer the actual result of the service system in the form of a finished product.

Furthermore, although the customer is granted an overview of the process, they are unable to verify the outcome of the individual steps. As an example, if it had been agreed that the roof of the building is to be blue but due to an error in communication or implementation it was painted green instead, there is no way for the customer to repair this error before the end of the service and the delivery of the final product.

Moreover, due to the complexity of the real-estate life cycle process and the numerous participants, the ‘clean’ lines of separation will be difficult to maintain. Unlike in other service system, the interactions between the various stakeholders are non-linear. Hence, the two-dimensional format of the service blueprint is insufficient in adequately representing the multifaceted interactions and processes of the Facility Management services.

4.4 Cooperation Experience Model

Hence, a new framework was created that adequately addresses the complex requirements of service system visualization; in particular, in hybrid value creation processes such as Facilities Management. The development of this visualization model is based on the results of the project “FlexNet” (2011–2013) promoted by BMBF (Federal Government Department for education and research, Germany). The FlexNet projection is a tool for identifying and documenting flows of information during the planning and operation of buildings (Bräuer, Knackstedt, Matzner 2013; Averbeck et al. 2013). In the current project “Cooperation Experience”, this projection is developed further. The initial results are applied in the following solution for the effective visualization of service processes. For modelling the cooperation and information interfaces, several levels are needed which have different detailing depths (Figure 4).

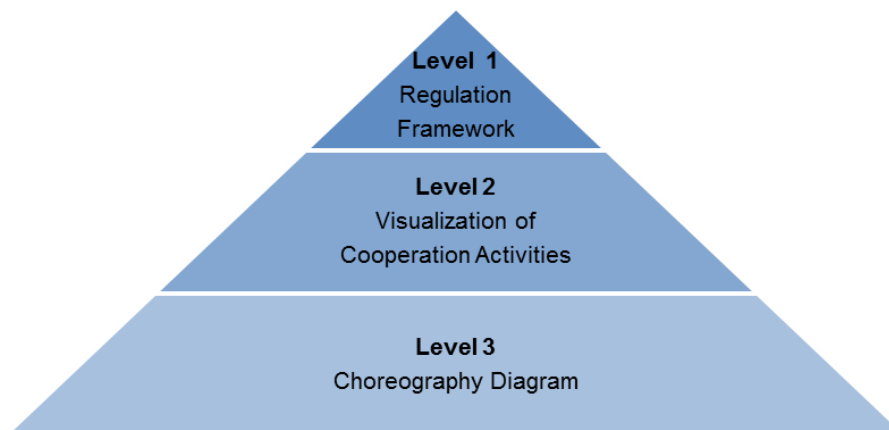


Figure 4. Method framework of the Cooperation Experience Model..

The first level gives a quick overview of processes, while the second level describes the activities between the cooperation partners, and in the third level, the processes are completed with detailed information.

In the first level (Figure 5), the processes needed for the whole service process to generate a performance are described. The focus is on gaining a quick understanding of the gross process without specific knowledge. The involved partners are related to the chronologically arranged process steps. This framework should be discussed in the first project meeting and the first meeting with the customer to assign responsibilities. The whole process has to be captured from the beginning to the end. Neither weak points nor room for improvement are pictured in the first level.

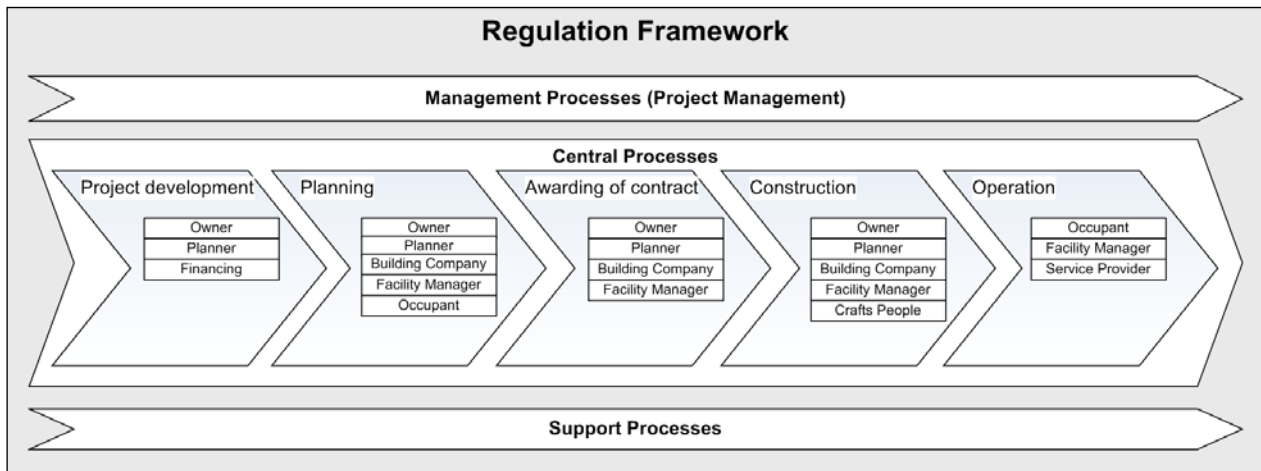


Figure 5. Regulation Framework.

The second level (figure 6) represents a “cooperation-arena” which contains the processes identified in the first level with their activities. Many arenas exist in this model such as process steps in the regulation framework of the first level. Hence, every process step of the first level is a framework for one cooperation arena. In the arena, every process relevant to the stakeholder is presented. Moreover, information objects which need to be interchanged between the players for the process are described.

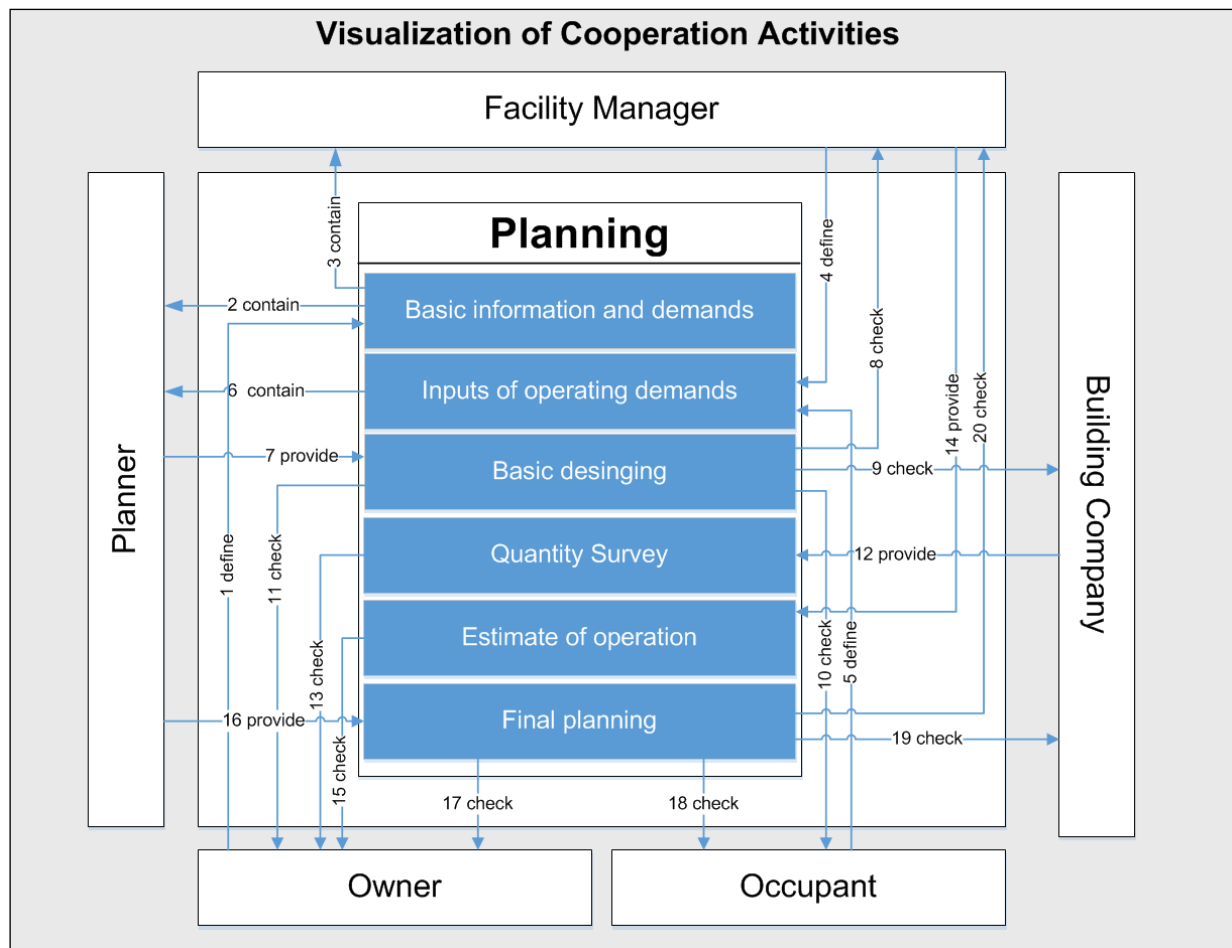


Figure 6. Visualization of Cooperation Activities.

The stakeholders are arranged around the arena and are connected with arrows. For the customer (owner), the cooperation activities are obvious in terms of who the emitter is and who the addressee is. The customer is part of the arena and they have an overview of with whom they have to cooperate. The order of interactions is numerically marked. In addition to the numbers, verbs on the arrows describe what happens with the information. In the middle of the arena, the information objects are located which are part of the process steps. They are ordered chronologically among each

other. The customer is able to spot at a glance who is responsible for which information and, therefore, who their contact person is. To create the arena, the following questions have to be answered: Who initiates which activity? Which stakeholder is involved in this activity? And which information has to be sent to these stakeholders?

In the third level (figure 7), the processes described in the second level are detailed. The purpose of this level is to support the processes of the second level with more detailed information. With the help of the choreography diagram, potential loop lines and branches can be pictured. A choreography diagram always displays exclusive processes with two or more player. Customers can see in detail which stakeholders work together, at what time and which information objects are exchanged. They are informed of when they can count on results and information. Simultaneously, the documentation of every single process is ensured so that traceability and transparency can be achieved. Hence, customers can plan when they want to compare their expectations with the intermediate results to intervene if the expectation gap is too big. Moreover, they know when the other stakeholders need their input. This reduces failures of coordination and optimizes the process flow and the intermediate results and, therefore, the final result.

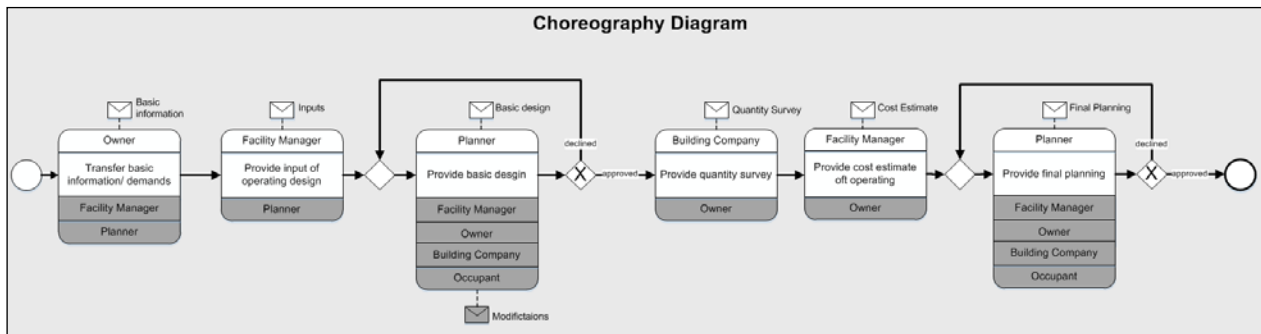


Figure 7. Choreography Diagram.

With the help of this model customers feel integrated in the process. They can follow the whole process, have opportunities to intervene, and can actively influence the results. The feeling of being able to participate in the results leads to higher customer satisfaction.

5 Conclusion

Coherent visualization of service processes is essential to the prosperity and effective management of service businesses. Clear customer understanding of the service system can lead to the closing of expectation gaps, the active participation of the customer in service operations, enhanced coordination of diverse activities, and improved communication between stakeholders among numerous other benefits. However, due to the complex and intangible nature of service delivery systems this can be difficult to achieve.

The Cooperation Experience model developed in this paper is recommended for use in the visualization of multifaceted service systems such as hybrid value creation in Facilities Management. The model offers a comprehensive knowledge of the entire system, the various stakeholders and participants, and their roles in the detailed system procedure and flow of information.

Further advancement can be made to the model by implementing additional information and indicators. Specifically, ratings of the process or performance, customer satisfaction indices, and completion time assessment can enhance the rigorousness and expediency of this visualization approach.

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Transcending the division of 'economic' and 'social' innovation

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This paper aims to transcend the division of 'economic' and 'social' innovations by drawing from the emerging service ecosystem perspective. This view has three fundamental implications on innovation. First, it offers unifying basis for considering all human collaboration as value co-creation through direct and indirect service exchange. Second, it portrays innovation not as a novel output, but as an institutional change in how value is co-created. Third, it conceptualized value co-creation simultaneously framed by multiple nested 'levels' of institutional context which bridges the micro and meso level analysis more common to 'economic' innovation with the macro level of 'social' innovation and provides the conceptual grounds for leveraging valuable insights from both domains to build a more unifying theoretical basis for innovation.

1 Introduction

Conventional literature on 'economic' innovations builds heavily on assumptions and models characterized by technical emphasis, manufacturer-centricity, transactional nature of exchange, and profit maximization (see e.g. Godin, 2006; Howaldt; Schwarz, 2010). The literature on 'social' innovation, i.e. new solutions for societal challenges, on the other hand, highlights the importance of a systemic view on innovation, the centrality of collaboration, and the underlying institutional processes (see e.g. Howaldt; Schwarz, 2010; Pol; Ville, 2009). Hence, 'social' innovations are often seen as something very different from 'economic' innovations (Mugan et al., 2007). In this paper we argue that, while this juxtaposing may offer some insights, it is more constraining than enabling for the development of a unifying theoretical basis for innovation studies. Hence, this paper aims to transcend the division of 'economic' and 'social' innovations by drawing from the emerging service ecosystems perspective (Vargo; Lusch, 2011; Lusch; Vargo, 2014) grounded in service-dominant (S-D) logic (Vargo; Lusch, 2004, 2008).

Central to S-D logic is the transcending concept of "service" that shifts the focus of value creation and exchange from outputs (e.g., goods and services) to a process of actors applying their competences and other available resources for the other's benefit (Vargo; Lusch, 2004). That is, service is exchanged for service, either directly or indirectly (e.g., through a good or money). Reframing the foundational basis of exchange this way provides a unified lens for considering all human collaboration, whether it would be characterized as 'economic' or 'social' in traditional terms, aiming at improving wellbeing, that is, value co-creation through service-for-service exchange. This unification roots in the systemic view of value co-creation inherent to S-D logic that sees all actors as fundamentally similar resource integrators. Hence, this view conceives society as a web of interconnected resource integrating, service providing and value co-creating actors forming dynamically evolving and complex service ecosystems (Vargo; Lusch, 2011). The emerging service ecosystems perspective highlights the importance of institutions – socially shared 'rules of the game' – in value co-creation (Vargo; Akaka, 2012). In other words, institutions provide the enabling and constraining structure of service ecosystems, that shape the ways in which actors co-create value by integrating their competences and other available resources, for the benefit of others and themselves (Lusch; Vargo, 2014).

The service ecosystems perspective has several fundamental implications on how innovation is viewed. In this paper, we focus on three key implications that reframe the goal, nature and scope of innovation. First, by emphasizing the co-created nature of value and the transcending notion of 'service' as the basis of exchange, the service ecosystem perspective offers a unifying basis for framing all innovation, whether traditionally seen as 'economic' or 'social', as aiming toward value co-creation through direct and indirect service exchange. Second, it portrays innovation not as a novel output produced by a firm, but as change in the institutionalized ways of co-creating value by integrating resources through service exchange in a service ecosystem (Vargo et al., forthcoming). Third, the service ecosystems are conceptualized as having multiple nested 'levels' of contexts that simultaneously frame value co-creation practices (Chandler; Vargo, 2011). This implies that innovation is always systemic by nature, unfolding in the nexus of dynamic interactions among fundamentally similar resource integrating actors, socio-technical systems, and reproduced institutions (e.g. Geels, 2004; Lusch; Vargo, 2014). Service ecosystems can, hence, be seen as interinstitutional systems characterized by the interplay of partially conflicting institutional logics enabling change and innovation (cf. Friedland; Alford, 1991; Thornton et al., 2012). This perspective bridges the micro level analysis more common in research focusing on the manufacturer-driven 'economic' innovations, technological innovations in particular, with the macro level emphasis of 'social' innovation research aiming, for example, at policy-level implications. Building on these premises, the service ecosystems perspective provides the conceptual grounds for moving beyond the distinction between 'social' and 'economic' innovation, leveraging valuable insights from both domains towards a unifying theory of innovation.

The paper is structured so that, first, we give a brief description of the prevailing dichotomy between ‘economic’ innovation and ‘social’ innovation. Second, we introduce the emerging service ecosystems perspective and its three key implications on innovation studies. We then discuss how the implications of the service ecosystems perspective reframe the goal, nature, and scope of innovation and enable transcending the ‘economic’ and ‘social’ innovation dichotomy. We conclude the article with a discussion of the implications of our transcending view on innovation research.

2 Division of ‘economic’ and ‘social’ innovation

Seminal work on innovation studies dates back to Schumpeter’s (1934, 1950) analysis on the circular flow in economic life and disruptive character of development. Though Schumpeter noted that the economic life goes on in an ever changing social and natural environment and that these changes often condition industrial change, his focus on innovation was strictly limited to a producer-centric activity: “It is, however, the producer who, as a rule, initiates economic change, and consumers are educated by him if necessary; they are, as it were, taught to want new things, or things differ in some respect or other from those which they have been in habit of using” (1950: 65). Hence, Schumpeter took an extreme position assuming that the demand side would simply adjust to the supply side (Lundvall, 2010) and giving innovation research its prevailing manufacturer-centric focus.

The one directional view on innovation provided grounds for the development of the linear model of innovation that postulates innovation starting with basic research, continuing with applied research and development, and ending with production and diffusion (Godin, 2006). Hence, the linear model describes innovation as a rational process that can be decomposed into discrete stages or components each of which can then be planned, programmed and managed (Cooper, 2001) the same way as other, more routine activities (Price; Bass, 1969). It also narrowed the notion of innovation mainly as technical change emphasizing the material and tangible aspects of the phenomenon, and directed the focus of innovation at the advancements in the natural sciences and mechanical engineering to create new products and processes (Howaldt; Schwarz, 2010).

Due to these developments, the conventional literature on innovation is based on assumptions and models characterized by manufacturer-centricity, technical emphasis, transactional nature of exchange, and profit maximization (see e.g. Godin, 2006; Howaldt; Schwarz, 2010). Over time, this so called ‘*economic*’ (or business or industrial) *innovation* frame has been found problematic and restrictive. Hence, several different conceptualizations of additional ‘forms’ of innovation, for example user innovation (von Hippel, 2005) and open innovation (Chesbrough, 2006), have emerged, exposing the boundaries of the ‘economic’ innovation and extending the scope of innovation research.

One of these alternative forms is ‘*social*’ *innovation* (Mulgan, 2007; Howald; Schwarz, 2010). Although mostly ignored by the ‘mainstream’ innovation research, social innovation has experienced a surge in social sciences over the past twenty years (Pol; Ville, 2009; Howald; Schwarz, 2010). Although considerable amount of effort has been made to identify social innovation as a distinct type of an innovation, the concept still remains quite unclear with regard to terminology, concept and content (Pol; Ville, 2009; Howald; Schwarz, 2010). One way of distinguishing social innovations from other kinds of innovations relates to their goals. For example, Mulgan (2007: 8) defines social innovation as “innovative activities and services that are motivated by the goal of meeting a social need”. In other words, social innovations are seen as new concepts applied to overcome societal challenges such as population aging and environmental problems and oriented toward objects that are not primarily economically motivated (Dees, 2007; Howald; Schwarz, 2010). Hence, social innovation often focuses on human needs that are ‘not yet’ or ‘no longer’ perceived as important by either the market or the state (Howald; Schwarz, 2010).

According to Howald and Schwarz (2010), substantive distinction between social and economic innovations can also be found in their immaterial structure. In social innovation, change does not occur in the medium of technical artifact but at the level of social practice. Hence, a social innovation is seen as a new combination and/or new configuration of social practices in certain areas of action or social contexts. Therefore, the focus of social innovation research has been directed at the complexity and systemic character of the process of innovation (Fagerberg et al., 2005), one of its key characteristics being the widening identification of the variety and heterogeneity of the actors, organizations and institutions that are involved in the process of innovation (Howald; Schwarz, 2010). Social innovations are still, however, seen as predominantly developed and diffused through organizations whose primary purposes are social (Mulgan, 2007).

In our view, several problems stem from the juxtaposition of ‘economic’ and ‘social’ innovations, and portraying them as distinct forms of innovation. First, defining social innovation as separate from, or opposite to, economic innovation is problematic because the outputs of innovation processes taking place within, or initiated by, ‘economic’ actors, such as new technological artifacts, production or service processes, organizational forms and new markets (Schumpeter, 1934), can and do contribute to solving social needs and meeting social challenges (Howald; Schwarz, 2010). Second, new social practices that contribute to solving social problems can also influence the outputs of economic actors’ innovation processes, in particular technologies, in novel ways by developing new uses and meanings for them in the value creating processes (Orlikowski, 1992). With this view, it is obvious that social and economic benefits are often overlapping and mutually reinforcing; the economic benefit for the developer does not exclude social benefits for the users as sometimes implied in the social innovation literature. Hence, it may be beneficial for both economic and social innovation studies to elaborate further on the shared basis and mutual interconnections between social and economic innovations.

3 Transcending nature of the service ecosystem perspective

Service is exchanged for service – it is this simple idea that constitutes the starting point and the core of service-dominant (S-D) logic (Vargo; Lusch, 2004; 2008; 2011, Lusch; Vargo, 2006; 2014). S-D logic is an alternative worldview originally aimed at overcoming the products versus services (or tangible versus intangible output) -divide characterizing much of marketing as well as other business literatures (Vargo; Lusch, 2004; 2008). This was done by introducing the transcending notion of *service* that focuses on the process of serving rather than on the form of output. In S-D logic, service is defined as the application of resources (such as knowledge and skills) for the benefit of another (Vargo; Lusch, 2004). In other words, service is exchanged for service when actors apply their competences to provide service for others and reciprocally receive similar kind of service (others' applied competences) in return. Conceptualized this way, service becomes the fundamental basis of all exchange, providing a common framework for understanding both 'economic' and 'social' exchange.

Thus, S-D logic is based on an understanding of the interwoven fabric of individuals and organizations, brought together into networks and societies, specializing in and exchanging service (applied competences) to create value at the context of their everyday lives (Lusch et al. 2007; Chandler; Vargo, 2011). Hence, S-D logic views value as contextual and co-created through service-for-service exchanges among multiple actors (Lusch; Vargo, 2014; Vargo; Lusch, 2004). This opposes the traditional, goods-dominant (G-D) logic view on value creation and exchange that emphasizes firms as the (sole) value creators through the production of value-embodiment goods that are exchanged through market transactions with value destroying consumers.

Thus, S-D logic can be seen as a part of the more general move away from a mechanistic to a systemic worldview (Capra; Luisi, 2014) as it highlights the dynamic and complex nature of value co-creation by arguing that actors constantly apply their competences and integrate available resources from multiple sources for value creation (Vargo; Lusch, 2011). This systemic view is encapsulated in the concept of service ecosystems, defined as "relatively self-contained, self-adjusting system[s] of resource-integrating actors connected by shared institutional logics and mutual value creation through service exchange" (Lusch; Vargo, 2014: 161). The service ecosystems perspective emphasizes the co-created nature of value, the dynamic integration of resources, and the importance of institutions – shared rules, norms, values and beliefs, as well as shared language and technologies – as constitutive elements of service ecosystems.

The three following sections introduce three key insights of the service ecosystems perspective on innovation that provide a conceptual basis for transcending the prevailing division of 'economic' and 'social' innovations by reframing the goal, nature and scope of innovation.

3.1 Value is co-created through service exchange

S-D logic and its service ecosystems perspective (Vargo; Lusch, 2004; 2011; Lusch; Vargo, 2014) build upon the notion of value as co-created by multiple actors (cf. Prahalad; Ramaswamy, 2004), rather than being created by a single actor. Central to this perspective is the idea that value emerges and unfolds over extended periods of time, and is not tied to the discrete, production-consumption events (Vargo, 2009). This provides an alternative approach to the goods-logical view in which value is seen as created by firms (i.e., "producers") in the form of offerings, that is, outcomes of the firm's R&D and production process. Moving the locus of value creation from exchange to use transforms the notion value from one based on units of firm output to one based on processes of integrating resources (Vargo et al., 2008). Hence, value unfolds as resources from multiple sources are combined in the context of an individual's life. Thus, value is co-created, that is, driven by the integration, exchange and application of resources as the joint effort of various actors (Vargo; Lusch, 2008; 2011), and contextual, that is, uniquely derived and determined by each actor in their respective social contexts (Chandler; Vargo, 2011; Vargo et al., 2008).

Value co-creation in service ecosystems is enabled through service-for-service exchange (Vargo; Lusch, 2004; 2011). From the service ecosystems perspective, the fundamental purpose of any actor or collective of actors is therefore to "serve itself by serving others" (Lusch; Vargo, 2014: 17). Conceptualized this way, value co-creation becomes the fundamental basis of all activity in service ecosystems, leading to a definition of value as an improvement in system's wellbeing, that is, co-viability, which can be evaluated in terms of system's ability survive and prosper in its environment (Vargo et al., 2008; Vargo; Lusch 2014). In other words, by highlighting the co-created, systemic and contextual nature of value, S-D logic broadens the process of value creation beyond a firm's operational activities to include the active and essential participation of all actors in value co-creation.

Furthermore, the service ecosystem perspective suggests that all actors are fundamentally similar resource integrators that co-create value by integrate resources from multiple sources through reciprocal service exchange (Vargo; Lusch, 2011). The reason why the fundamental role of service in exchange is so difficult to see in the modern world is that in the efforts to improve our wellbeing, human kind has come up with several ways to co-create value more effectively by exchanging service indirectly. This means that the notion of service in S-D logic is not tied to the distinct moments of direct physical interaction among people. Instead, service can be provided indirectly, for example, in the form of a product or money. Hence, the emphasis on service as the fundamental basis of exchange in the service ecosystems does not mean that products and money are ignored. On the contrary, they are seen as important facilitators of service exchange: products are considered as vehicles for service provision (Lusch et al., 2007) and money as a 'right' for service (Lusch; Vargo, 2014). Through the different forms of indirect service exchange, both physical and

time related constraints of direct service exchange are being bent and value co-creation made more effective. Thus, the service focus is more general and transcending by its nature, since it covers exchange situations involving different types of goods as well as situations in which there are no intermediate products (Lusch; Vargo, 2014).

Value is co-created through the exchange, integration and use of resources from private, market-facing and public sources (Lusch; Vargo, 2014). Resources in S-D logic are viewed as anything (tangible and intangible) an actor can draw on for support (Vargo; Lusch, 2004). Resources can be roughly divided into two categories; operand resources that are usually tangible and static such as natural resources, and operant resources that are often intangible and dynamic such as knowledge and skills. This view suggests that innovation primarily involves the integration of operant resources – those that are capable of acting on other resources to create value (Vargo; Lusch, 2011). It is important to note that in addition to intangible resources, such as knowledge and skills, also technology, when viewed as potentially useful knowledge (e.g. Mokyr, 2004), can be seen as an operant resource (Akaka & Vargo 2013). This implies that technology is always an integral part of service provision (beneficially applied useful knowledge) and thus, always also foundational to value co-creation (Vargo et al., forthcoming).

Thus, the service ecosystems perspective offers a view on innovation that is based on service, understood the application of competences for the benefit of another. Actors engage in reciprocal service exchange in order to co-create value, that is, to improve the wellbeing of themselves as well as the system of which they are part of. Furthermore, the service ecosystems perspective emphasizes that value is co-created by integrating various resources from multiple sources through direct and indirect service exchange, making no distinction between ‘economic’ and ‘social’ exchange. Hence, the service ecosystems perspective portrays innovation as a complex and systemic activity aimed at mutual value creation in which no actor participates alone, but contributes to the emergence of new solutions together with other actors. The service ecosystems perspective also proposes a broader conceptualization of technology and views it as useful knowledge, as opposed to mere technical artifacts, making technology always foundational to value co-creation.

3.2 Innovation is institutional change in value co-creation

By shifting the focus of value co-creation and exchange from outputs to the process of serving, service ecosystem approach highlights the fact that all actors are fundamentally similar resource integrators interacting with each other through service exchange (Vargo; Lusch, 2011). When looked through this actor-to-actor perspective, the fallacy of the linear and sequential conceptualization of value creation, flow, and destruction characterizing much of the economic, marketing and innovation literature is revealed (Lusch; Vargo, 2014). Therefore, the service ecosystems perspective steers attention towards the existence of much more complex and dynamic exchange systems and points to a systemic view of generic actors embedded within an institutional structure (ibid).

The service ecosystems perspective reframes the human society as a web of interconnected value co-creating actors forming dynamically evolving and complex service ecosystems, in which value co-creation is facilitated by shared institutions (Vargo; Lusch, 2011). Institutions are the humanly devised schemas, norms, and regulations that enable and constrain the behavior of social actors and make social life predictable and meaningful (North, 1990; Powell; DiMaggio, 1991; Scott, 2014). Institutions, as ‘the rules of the game’, provide the structure for value co-creation and resource integration in service ecosystems by shaping the ways in which actors apply their competences and other available resources for the benefit of others (Vargo; Akaka, 2012; Lusch; Vargo, 2014).

Ultimately, this view suggests that innovation is driven by the collaborative efforts of various actors to find or develop new ways to co-create value within service ecosystems through changing the institutions that enable and constrain their actions (Vargo et al., forthcoming). Hence the nature of innovation changes drastically from the production of novel outputs by a firm to the process of institutionalizing new value co-creation practices by multiple actors in a service ecosystem. Compared to the traditional views on innovation, service-ecosystems approach not only removes the distinction between “producers” and “consumers” in value co-creation (Vargo; Lusch, 2011), but also the distinction between “innovators” and “adopters”, and argues that all actors participate in innovation with a fundamentally similar way by creating, maintaining and disrupting institutions (Vargo et al., forthcoming).

3.3 Multilevel institutional context frames value co-creation

The notion of service ecosystems is fundamental to value co-creation because it acknowledges how large-scale social structures and institutions evolve relative to the resource integration and service provision activities performed by individual actors within different contexts (Chandler; Vargo, 2011). The service ecosystems perspective allows zooming both in and out to see actors as well as collectives of actors, not in isolation, but in all of their dependencies and interdependencies generated by the web of service-for-service exchange relationships (Lusch; Vargo, 2014). Service ecosystems, resulting from these reciprocal service exchanges, are characterized by complexity. This means that building on top of an individual actor are structures composed of multiple individuals, such as families, firms, industries and nations, themselves composed of many parts and, in turn, parts of still larger structures (Ostrom, 2005: 11). What is a whole system at one level is a part of a system at another level.

Hence, service ecosystems are viewed as having multiple nested ‘levels’ of contexts that frame resource integration, service exchange and value co-creation (Chandler; Vargo, 2011). These different levels or frames can be conceptualize

as different institutional orders, such as family, religion, state, market, profession, corporation (cf. Thornton et al., 2012). Each institutional order has a central logic comprising a set of material and symbolic practices and organizing principles that provide logics of actions for individuals and organizations (Friedland; Alford, 1991; Jarzabkowski et al., 2009). A mechanism by which institutional logics exert their effects on individuals and organizations is when they identify with the collective identity of a social group related to an institutional order (Thornton; Ocasio, 2008). Individuals are simultaneously members of multiple social groups. Service ecosystems can be seen as interinstitutional systems characterized by various nested institutional logics (cf. Friedland; Alford, 1991). The macro level systems emerge from the micro level service-for-service exchanges (Lusch; Vargo, 2014) and provide the context by which the micro level exchanges are framed (Chandler; Vargo, 2011). The multiple levels of institutional arrangements simultaneously manifest themselves in the actions of individual actors in value co-creation and as the actors connect with one another through their service-for-service exchanges, they ultimately join their partially different and partially shared institutional constellations together (cf. Chandler; Vargo, 2011). In other words, the multidimensional context composes of reciprocal links among actors connecting their partially shared institutional logics that guide the actions and interactions of individual actors. This constitutes the unique context of a specific exchange.

As a result, value co-creation is framed by complex and multidimensional institutional contexts that bring forth the diversity of institutional logics. The consequence of the diversity is that actors often encounter situations in which many institutional logics offer contradicting and conflicting interpretations and prescriptions for action (Friedland; Alford, 1991; Thornton et al., 2012). The intersecting and overlapping institutional logics can, for example, create conflicting views on what value is, and how resources should be integrated for value co-creation (Vargo et al., forthcoming). These conflicts and contradictions in institutional logics are the sources of choice, synthesis and change that follows (Friedland; Alford, 1991; Seo; Creed, 2002; Thornton et al., 2012) and can be seen as prerequisites of innovation.

Viewing service ecosystems as interinstitutional systems enables to see how value co-creation through service exchange is always simultaneously framed by multiple nested 'levels' of unique institutional contexts which bridge the micro level interactions (e.g., between companies and customers) emphasized in 'economic' innovation research, with the macro level emphasis (e.g., changes in norms or policies) prevailing in studies focusing on 'social' innovation. This is well aligned with the views that innovation is always systemic by nature, unfolding in the nexus of dynamic interactions among human actors, socio-technical systems, and reproduced institutions (e.g. Geels, 2004).

4 Discussion

In the current innovation literature a distinction is often made between 'social' and 'economic' forms of innovation. In this paper, we argue that while this juxtaposing may offer some insights, it is more constraining than enabling for the development of a unifying theoretical basis for innovation studies. In order to transcend the division of 'economic' and 'social' innovation, we draw from the emerging service ecosystems perspective and argue that it provides the conceptual grounds for transcending the above stated dichotomy and enables leveraging valuable insights from both domains while moving toward a unifying theory of innovation. The three key implications of the service ecosystems perspective are presented in Table 1. They reframe the goal, nature and scope of innovation.

Table 1. Transcending the division of 'economic' and 'social' innovation with the service ecosystems perspective.

	Economic innovation	Social innovation	Service ecosystems perspective
Goal of innovation	Maximizing profits for the firm by selling outputs	Creating 'public' good by overcoming societal challenges	Improving systemic wellbeing by co-creating value through service exchange (serving itself by serving others)
Nature of innovation	Change in technical artifacts / outputs	Change in social practices and settings	Institutional change in value co-creation practices
Scope of the innovation	Process: Linear, one-directional manufacturer-centric process from research to diffusion Focal actor: Firm (single)	Process: Complex and systemic process on the level of social behavioral patterns. Focal actors: Non-profit organizations (multiple)	Process: Complex and systemic process of creating, maintaining and disrupting institutional logics framing value co-creation in multiple nested 'levels' of context Focal actors: Generic actors (all)

The first implication of the service ecosystems perspective transcends the division of ‘economic’ and ‘social’ innovation by broadening the goal of innovation. The manufacturer-driven ‘economic’ innovation literature emphasizes the profit maximization of the innovator – firm – and highlights gaining a competitive advantage over competitors in the market as the goal of innovation. ‘Social’ innovation, on the other hand, takes as its goal to overcome societal challenges, taking the perspective of public and non-monetary ‘good’, as opposed to the benefit of an individual private corporation. Finally, the service ecosystems perspective provides a more general notion of value co-creation i.e. increasing one’s wellbeing by serving others and being served in return. The systemic nature of value co-creation also implies that the prerequisite for individual wellbeing or viability is the viability of the more general system of which the actor is a part. To capture this idea Vargo and Lusch (2014) have recently introduced the notion of co-viability.

The second implication relates to the nature of innovation. The ‘economic’ innovation literature usually focuses on the new technological artifact as the output of the innovation process, although recent research has expanded the notion of innovation by also considering other outputs, such as services, as well. ‘Social’ innovation, like economic, focuses on the output of the innovation process, but expands the notion of innovation to cover also the overall processes and practices that allow actors to address specific social problems. While this is very welcome development, it often leads to a situation in which the importance of the ‘social’ elements is emphasized to the extent that the influence of economic processes and technology is forgotten altogether. The service ecosystems perspective views innovation as an overarching change in ongoing value co-creation practices among multiple actors. As value co-creation in service ecosystems is enabled and constrained by institutions, the way value co-creation practices can change is through the change in the institutional logics that guides them. Hence, all actors in service ecosystems are perceived as fundamentally similar resource integrators that engage in institutional work, that is, in creating, maintaining and disrupting institutions.

The third implication of the service ecosystems perspective draws attention to the scope of innovation and the innovation process. In the manufacturer-centric ‘economic’ conceptualizations, innovation is perceived as a linear and one-directional process driven by the single actor (usually a firm) from the early research stages through to launch and, possibly, to the diffusion of the technology. Social innovation, on the contrary, takes a more systemic view on the phenomenon according to which many stakeholders participate in the process of shaping new solutions to social problems. The social innovation research, however, tends to focus on non-profit organizations to distinguish itself from the for-profit focus in economic innovation. The service ecosystems perspective encapsulates both for- and non-profit actors, and all other actors, within its systemic view of value co-creation, according to which innovation is a complex and systemic process driven by many actors contributing their resources and visions to shaping the solutions and promoting their adoption. Furthermore, it acknowledges the influence of the surrounding institutions in relation to the individual service efforts among actors. In other words, the service ecosystems perspective conceptualizes value co-creation simultaneously framed by multiple nested ‘levels’ of institutional contexts. This context continuously evolves and changes through the service-for-service exchanges linking different actors together. For individual actors, the resulting view is one in which they frequently encounter situations in which many institutional logics offer contradicting and conflicting interpretations and prescriptions for action. This causes uncertainty, confusion and stress, but is also the basis for choice, synthesis and change, that is, the prerequisites for innovation.

Through these three transcending implications, both social and economic innovation can be understood as special cases of the service ecosystems-based notion of innovation. In the context of goals, improvement in wellbeing does not discriminate between the generation of financial profit for one actor (firm) and the generation of public good (often defined by a few actors for the whole community). In terms of the nature of innovation, the service ecosystems view accommodates both tangible ‘vehicles’ of service provision and exchange, and the broader processes that make use of various tangible artifacts as well as competences in the process of solving specific problems. The perspective also (re)conceptualizes technology as useful knowledge and makes it fundamental in value co-creation. Finally, our complex and systemic view lends itself to both actor-centered studies of innovation processes, as well as to studies focusing on systems of specific types of actors seeking to develop new value co-creation practices by changing social structures.

Thus, our framework offers a more generic conceptual framework within which different ‘types’ of innovations can be studied. For the ‘economic’ innovation research our approach offers insights that extend beyond the firm-centered development and production of novel artifacts, allowing analysts to understand the purpose of these artifacts and how the financial performance of the firm depends on the ability of the new artifact to enable new and better forms of co-creating value in the ecosystems level. Furthermore, it helps expand the firm-centered viewpoints to surrounding networks which contribute to the emergence of novel artifacts.

For social innovation research, the service ecosystems perspective offers a fundamentally similar yet more generic conceptualization of innovation in which the researcher is not limited to specific types of organizations or outputs. In this sense, our view separates the systemic dimension from the social benefit often entangled in social innovation research, establishing the basis for systemic studies of innovation in all contexts. For social innovation research, our emphasis on the institutionalization of new solutions suggests that more attention could be paid to the contested and political processes that often surround the development of solutions to social problems, not the least because they often entail the involvement of the public sector with political decision-making and bureaucratic resource allocation. Furthermore, as literature around social enterprises and social movements illustrate, the change processes themselves involve reconciliation among multiple institutional logics advocated by different stakeholder groups with differing

abilities to impose new solutions, or protect the old, over others (e.g., Battilana; Lee, 2014; Benford; Snow, 2000). Innovation studies have a lot to learn from these discussions.

5 Conclusions

S-D logic (Vargo; Lusch, 2004; Lusch; Vargo, 2014) provides a lens to look at the human society in a different light. According to it the billions of human actors and millions of organizations are part of many complex and evolving service ecosystems. By reframing all human action as value co-creation in service ecosystems by fundamentally similar kinds of actors integrating, applying and providing resources for each other through service-for-service exchange, S-D logic provides a broader framework to make sense of the underlying complex phenomena such as innovation.

In this paper, we argue that this service ecosystems perspective on innovation provides the conceptual grounds for moving beyond the distinction between ‘economic’ and ‘social’ innovation. It does this by reframing the goal, nature and scope of innovation in a transcending manner which allows seeing both ‘social’ and ‘economic’ innovation as special cases of the service ecosystems-based notion of innovation and enables leveraging valuable insights from both domains in order to build a more unifying theory of innovation.

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Reflecting Rural Supply Regarding Demographic Change in Germany: A Qualitative Analysis of Requirements and Acceptance to Preserve Quality of Live in Rural Areas

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Demographic change in Germany is characterised by low birth rates and increasing life expectancy. Especially rural areas suffer from this trend. Furthermore, this fact results in lower quality of life due to gradual reduction of infrastructure. However, there is a rising need for supply because of ageing population. The objective of this paper is to analyse which requirements citizens have regarding local food and medical supply concepts and what kind of solutions are possible. The aim is to identify critical requirements and acceptance factors that should be considered when establishing local supply concepts in rural areas in Germany.

1 Impact of demographic change on the basic supply with goods and commercial services in rural areas

1.1 Demographic change and rural areas

Demographic change in Germany is characterised by low birth rates and increasing life expectancy. Until 2060 the population is expected to decline from 80.5 million to 65-70 million people. Simultaneously, the proportion of higher-aged population groups will increase, e.g. people aged 80 years and older will triple until 2060 (Statistisches Bundesamt, 2009). Especially rural areas are affected by these trends. Rural areas make up to 96 percent of Germany's territory and 71 percent of the German population. According to the OECD (2007), rural areas are divided into three categories: predominantly rural, semi-rural, predominantly urban. The rural areas are characterized, among others, by a lower population density (less than 150 inhabitants per square kilometre), an ageing population and a minimally equipped infrastructure and basic services. Whereas populated areas record an increasing number of inhabitants (OECD, 2007), rural areas suffer from a declining population.

1.2 Challenges of rural areas in demographic change

The decreasing population results in lower quality of life due to gradual reduction of infrastructure. However, there is a rising need for rural supply because of ageing population. In the future, the group of over 65 year olds will gain importance in many areas of life. But these people do not represent a homogenous group. Hence a generalization of the characteristics and needs of the elderly is impossible. However, seniors differ especially due to ageing compared to younger generations and thus have special requirements towards their environment. A particular challenge of demographic change deals with a quantitatively and qualitatively adequate supply of the population with services and infrastructure. Especially in sparsely populated rural and structurally weak areas where younger people leave and mainly the elderly remain there could be supply deficits through vacancy of buildings, lack of economic resources and financial constraints on local authorities. This in turn entails the dismantling of infrastructure, such as the setting of bus services, the closure of schools and post offices. Looking at the forecast of the next few decades, an increase of these trends in some regions is foreseeable.

1.3 Local supply in rural areas in danger

Local supply in rural areas is determined by different interacting factors, e.g. food, health care, social interaction and political systems. Services of general interest comprise services that offer a special public interest (Einig, 2008, 17). These are goods and services that are necessary for human existence and aspects of the welfare state principle. The EU Commission defines services of general interest as market and non-market services that are provided in the public interest and therefore linked by the authorities with specific public service obligations (KOM 2000, 42).

Services of general interest are technical facilities (as to say water supply, sewerage and waste management, communications and transport infrastructure), social services (e.g. education including child care, cultural institutions, health and elderly care) as well as emergency services, fire and disaster control. In particular, ensuring high quality of public health is one of the central tasks of the German welfare state. Local supply is often not directly taken into account as it is mainly provided by private service providers. However, local supply is a basic need that must be guaranteed in terms of welfare. Especially inside the residence, local supply has to satisfy primarily short-term and medium-term demand for goods that are required every day. Altogether, local supply is an important part of social

participation and part of constitutionally required equally securing of living conditions (see Article 72 (2), Constitution of the Federal Republic of Germany).

2 Securing the future and viability of the rural areas - but how?

2.1 Need for conceptual strategies for new supply solutions

For the purposes of equal living conditions, for all sections of the population and for effectively securing the future and viability of rural areas despite of demographic change, it is inevitable to develop basic conceptual strategies for new supply solutions. Due to the ageing of the population, local supply requirements increase. Furthermore experience shows that people aged 65 years and older visit general practitioners most often. The paper therefore focuses onto these two specific but highly relevant areas of medical supply and local supply.

2.2 Local food and medical supply as study focus

Structural changes in retail food supply: There is a significant decline in sales points in Germany - from 150,000 in 1966 to about 55,000 in 2002 (Kuhlicke, 2005). In particular, smaller, neighbourhood-oriented retail outlets are affected by closures. Furthermore, a clear structural change regarding forms of offering can be observed - from independent retailers to supermarkets, hypermarkets and discount stores. The locations of food retailers are increasingly oriented to the accessibility by car and have increasing requirements (e.g. sales area of at least 700 square metres). Demographic change will exacerbate this situation because a higher proportion of population is affected by these problems. Especially less mobile population groups are affected by the deterioration of local supply. About 8 percent of Germany's population are people with disabilities. Especially so-called corner shops are threatened by the ongoing rural development. These corner shops are retail stores that offer food and other everyday items. The business is often so small that only one person, often the shopkeeper him-/herself, works there. In Germany, the common speech calls these shopkeepers "Aunt Emma".

Threatening outpatient medical care in many rural areas: In the next few years, many doctors will retire: this is a consequence of the unfavourable ageing structure of active medical professionals in Germany. From 1999 to 2009, the average age of contract doctors increased by three years to 52.1 years (Adler, 2011). It will be difficult to find successors for all practices - especially in rural areas. One reason why re-occupation of physician practices is so difficult in rural areas is the lack of attractiveness, especially for young professionals. Many doctors complain about unfavourable conditions. High workload with decreasing profitability as well as negative factors such as the lack of cultural events or long distances to educational institutions and schools for children discourage many young doctors.

2.3 Objectives

The objective of this paper is to analyse which requirements citizens in rural areas have regarding supply concepts and what kind of solution is possible. The aim is to identify critical requirements and acceptance factors that should be considered when establishing local supply concepts in rural areas in Germany. Especially the following questions will be responded:

1. What kind of local structure is needed to provide a basic supply of goods and services in rural areas?
2. What kind of solutions is needed in outpatient medical supply to meet the necessities of a rising number of consumers in rural areas?

3 Requirements and acceptance of the population as key criteria for new concepts

3.1 Identification of requirements and acceptance factors based on Kollmann (1998, 2000)

In order to examine predictable factors related to requirements and acceptance of citizens regarding new concepts in supplying rural areas, a specific model is chosen to identify these critical factors: the dynamic acceptance model of Kollmann (1998). Within this model, acceptance is viewed as a process with three phases (see Figure 1):

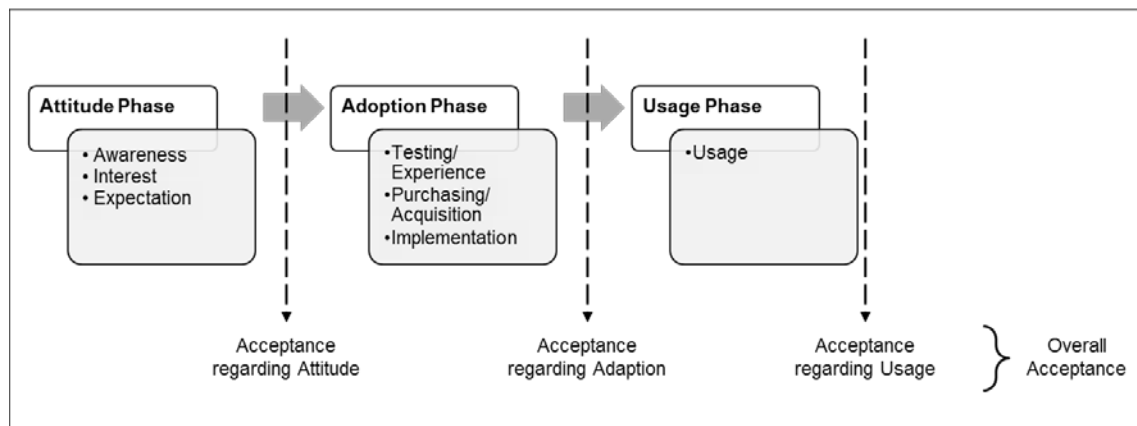


Figure 1. Phases of the dynamic acceptance model of Kollmann (1998) (own illustration based on theory of Kollmann 1998).

The attitude phase consists of awareness, interest and expectation. Here the expectations and attitudes of potential users that lead to a positive buying decision or excludes a possible purchase are examined and highlighted. The process results in so-called attitude acceptance. During the adoption phase, potential consumers run through different processes, which are divided into testing/experience, purchasing/acquisition and implementation. As a result, a new acceptance value (adoption acceptance) is created. If a purchase decision is positive, the actual use and acceptance of an innovation can be observed (use phase). At the end of this phase, a first reliable result in terms of overall acceptance of a product, service or concept can be observed. In this paper we focus on the attitude phase, examining awareness, interests and expectations.

In order to identify the factors that influence the requirements and acceptance regarding local and medical supply solutions, this paper uses Kollmann's (2000) classification of determinants that affect acceptance directly:

- **Product-related determinants:** these are typical characteristics that are necessary to assess an innovation, such as relative advantage, complexity, compatibility, divisibility, communicability, uncertainty and use of readiness. Use of readiness refers to the ability of innovations to enable an individual and problem-oriented use.
- **Adopter-related determinants:** these contain socio-economic criteria such as age or social status as well as psychographic criteria. To these belong e.g. lifestyle, personality, perception, motives, attitude and expectations. Furthermore these determinants include the observed buying behaviour and actual usage behaviour. The observable buying behaviour refers e.g. to product choice and price behaviour. Regarding actual usage, a relationship between frequency of use, usage patterns and use of acceptance is generated.
- **Company-related determinants:** these describe organization-specific variables such as firm size, location, economic situation, organizational structure and industry. They could also include buying-centre-specific variables such as decision makers, influencers, users and buyers. Furthermore, there are decision maker specific variables such as socio-economic variables, psychographic variables, professional motivation, risk-taking, position in the company and buying-/utilization-related variables.

There are also **environment-related determinants** that form the overall framework and thus influence the process in general. This entails the technological environment (e.g. norms, standards, technical development), the macro-economic environment (e.g. market structure, economic situation, funding sources, market growth expectations), the political and legal environment (e.g. data protection act, interest groups, competition law, market access restrictions) as well as the socio-cultural environment (e.g. public opinion, social norms, user groups, communication habits).

Against this background, it is possible to define the evaluation grid for the respective creative workshops and to create the workshop concept in order to get answers to these acceptance determinants (see Figure 2).

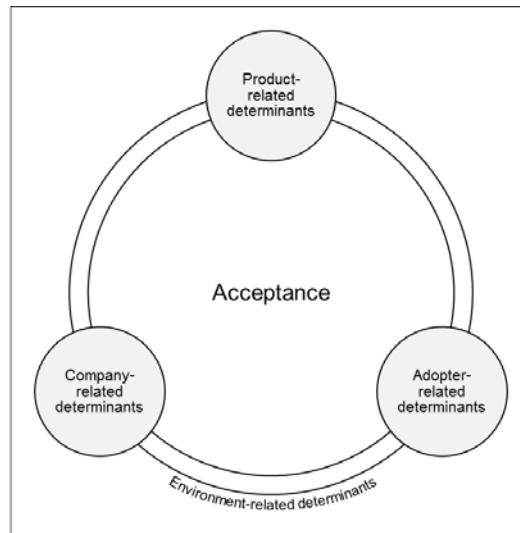


Figure 2. Evaluation grid of requirements and acceptance factors of supply concepts in rural areas (own illustration based on theory of Kollmann 1998, 2000).

3.2 Direct integration of people into the study based on the life situation approach

In order to develop new sustainable concepts, it is important to understand that people act and behave in different living situations and have to deal with different external circumstances. These are often not comparable from person to person. Life of a person includes a variety of dimensions such as income, employment and occupation, wealth. But also social life, social care and network resources. The inclusion of individual perception and orientation is a necessary condition in order to understand people decisions, expectations, hopes and fears. Empirical studies of innovation research show the importance of users as active participants in successful innovation development (von Hippel, 1998; 2001). The interaction with users in the design phase of new concepts, be it products or services, allows a greater orientation towards needs regarding innovation and the early response to problems of acceptance by later-users, which consequently leads to an improvement in quality of innovations. Thus, in order to develop sustainable concepts for solving social and economic problems, it requires a participatory process with inclusion of citizens in every workshop setting and topic.

4 Methodology

There were methodological problems answering these research questions because everyday life of citizens is highly complex but has to be displayed within their complexity. That is why, a qualitative research approach was chosen. Regarding on both supply topics “medical supply” and “local supply”, specifically developed workshop concepts were designed so that citizens are involved as experts in the development and evaluation of practical, implementable and sustainable solutions.

4.1 Setting

In between November 2013 and July 2014, a total of five creativity workshops in different German cities (Nuremberg, Regensburg, Coburg, Augsburg and Wuerzburg) were performed with a mean number of 10 participants. Since critical requirements for medical and local supply services should be generated from a use perspective, a user-centered design of workshops was chosen. This approach guaranteed that the user took over an active role in the generation and assessment of new services (Edvardsson et al. 2010). It was observed that most of the participants were over 60 years old, native speaker and they were often socially committed. Through their registration, the participants agreed in taking part in the workshops voluntarily and free of charge. The implementation of both workshop topics “Aunt Emma Is Dead! - Long Live Aunt Emma! - New concepts in the local supply” (workshop theme 1) and “Rural Areas In Transition - Prospects of Future Health Care” (workshop theme 2) was hosted within the so-called “Regional conferences for more social participation (RegiKon)”. The aim of these regional conferences was to identify novel concepts and potentials of information and communication technologies and to network. There should be an exchange of experiences and the creation of a platform to provide information in the context of social participation, civic engagement and neighbourhood (for further information: <http://www.geronto.uni-erlangen.de/forschung/regikon.shtml>).

4.2 Special workshop concept - Focus groups und personas

In the context of the workshop concept based on appropriate creative activities, the participants are guided and encouraged to reflect which requirement and acceptance factors of the examined solutions can be listed. In addition to

their personal opinion, the participants are dealing with the personas method in order to put themselves in the position of different groups of people and their needs.

Focus group interviews were chosen due to the fact that usually six to ten respondents can be interviewed at the same time, a recording by audio or video and a natural speech situation are possible. Disadvantage focusses the lack of structure of the responses, so coding is difficult, as well as the fact that not every participant can answer each question on his own including that there is little information about each participant him-/herself (Kuß, 2012; Mayerhofer, 2009). The content and order of the temporal sequences are usually well defined (Blank, 2011). Each participant was free to select his preferred workshop topic at the conference. Thus, it could be assumed that each participant has a concern or at least interest in the subject that was chosen. Furthermore, by choosing the form of "managed creative group", a sub-form of group discussion, the performance of the group could be increased playfully in combination with a variety of creative techniques (Kuß, 2012).

Personas as special kind of projective tools were used. A uniform definition of personas does not exist. However, there is consensus in literature that personas are fictional archetypical characters that represent distinct groupings of behaviour, goals and motivations (Chen et al., 2011). They "represent groups of users" (Chapman et al., 2008) and represent persons that are representative for the investigated context (Nielsen, 2013). In our workshop, personas were used to enable the participants to place themselves into the situation of specific groups in order to identify irregularities or work out suggestions for improvement or advantages and disadvantages and different customer needs or benefits.

4.3 Approach

The workshop concept was applied methodically to both workshop topics, local supply and medical supply, and was carried out in three parts within 90 minutes. Up to three moderators supported the implementation of each workshop.

In the first part, the participants were welcomed and introduced to the topic. In the second phase of the workshop, participants were divided into three groups and each group was led by one moderator. First, participants were asked to approach the object of investigation in a playfully manner. For this, each participant had the opportunity to tinker with his own "Aunt Emma" or his own "Country Doctor" according to their own ideas with paper dolls. The participants had the choice between different torsos, heads and various clothes. Upon completion, the participants presented their specially designed dolls orally in their group and explained what memories, ideas or associations they had according to their customized doll. The dolls were then pinned on a board that was clearly visible.

Afterwards (second part), the participants were set in a story about an imaginary village with various situations. For this purpose, the moderators asked the participants to put themselves in the situation of residents in this village. In the first workshop topic (local supply) there existed a village shop on site and the residents were asked about their own ideas and needs. The second workshop topic (medical supply) used a negative scenario in which a recognized doctor retires and leaves with no successor to his practice. All participants had the opportunity to concretely address the issue of rural supply, as they are personally affected and had to search for their own solution proposals. After that, all participants were asked – despite their "I"-perspective – to put themselves into the perspective and position of other two personas in each group (see Table 1).

Table 1. Personas used per workshop topic per groups (own illustration).

	Personas in workshop topic 1: Local Supply	Persona in workshop topic 2: Medical Supply
Group 1	mother, 35 years (single parent, two children, unemployed)	old lady, 87 years (no car, walking aid, children living in the city)
	pensioner, 81 years (widowed, three adult children limited mobile)	
Group 2	grandmother, 67 years (married, five grandchildren, former secretary)	
	teenager, 18 years (single, no children, trainee)	
Group 3	family man, 52 years (married, one child, enterprise employee)	
	hairdresser, 40 years (in a relationship, one child, self-employed)	

Regarding workshop concept 2 (medical supply), besides own ideas for new health care concepts various existing or potentially useful supply concepts for health services were presented in the group work in order to derive statements of what is needed and accepted (see Table 2). Health care in rural areas in Germany is discussed to be designed in the future especially by combining services in central locations (medical center), mobile care services as mobile medical practices, the use of telemedicine, temporarily occupied practices, pick-up and delivery services and community nurses. The participants of the workshops had the opportunity to discuss the advantages and disadvantages of each concept

from the “I”-perspective and the particular perspective of the used personas (due to the discussion of six medical supply concepts only one persona was presented in each group in workshop topic 2) and to bring suggestions for improvement.

Finally, in the third part, respective group results were presented all participants in a plenary by the moderators. In an open discussion, participants once again had the opportunity to deal more intensively with the topic by discussing. All statements within these workshops were recorded by voice recorders and evaluated with content analysis (e.g. Kassarian 1977). In the content evaluation, based on the acceptance model of Kollmann (1998), aggregated categories were formed for all workshops which in addition to the requirement criteria allow insight into the spontaneous reactions and motivations of the participants, such as enthusiasm, desire, rejection etc.

Table 2. Medical supply concepts regarding workshop concept 2 (own illustration).

	Medical Supply Concepts	Description
Group 1	telemedicine	...means that health data are digitally recorded and transmitted to healthcare workers. So there is a constant medical care across spatial distances.
	community nurse	...is a specially trained nurse who makes house calls to patients once or twice a week. She is responsible for care and follow-up care in home settings, but does not determine types of therapy.
Group 2	mobile medical practice	...are special converted vehicles, in which treatments are carried out once or twice a week. Check-ups and services such as vaccinations and dressing changes can be covered.
	pick-up and delivery services	...ensure permanent transfer to the next town or a home supply. The patient can visit a doctor or is provided with medicines, etc. at home.
Group 3	temporarily occupied practice	...is a second practice of a general practitioner. Patients can visit a doctor during consultation hours that are offered once or twice a week.
	medical center in a neighboring village	...is a permanent institution with numerous doctors. Many therapeutic and diagnostic options are offered. However, the patient is responsible for the transport himself.

5 Findings

Based on the qualitative content analysis, the findings of this paper are profiles of requirements for sustainable models of rural supply and give recommendations for their design. These should lead to a higher efficiency regarding the implementation process of sustainable models for local supply in rural areas regarding basic supply of goods and services as well as outpatient medical supply.

5.1 Local structure for providing basic supply of goods and services in rural areas

Findings towards the first research question, what kind of local structure is needed to provide a basic supply of goods and services in rural areas, all answers point into the same direction: “Aunt Emma” is not dead, it must rather be revived. For all workshop participants, a corner shop represents an irreplaceable opportunity to provide them with food and demands of daily life. Based on the evaluation grid of this paper (see chapter 3.2), in the following, requirements and acceptance factors are explained and illustrated which were identified in the context of the content analysis and summarized in Figure 3. Since the statements that were found regarding personas show no differences - except for the product-related determinants - they were evaluated together with the “I”-perspective.

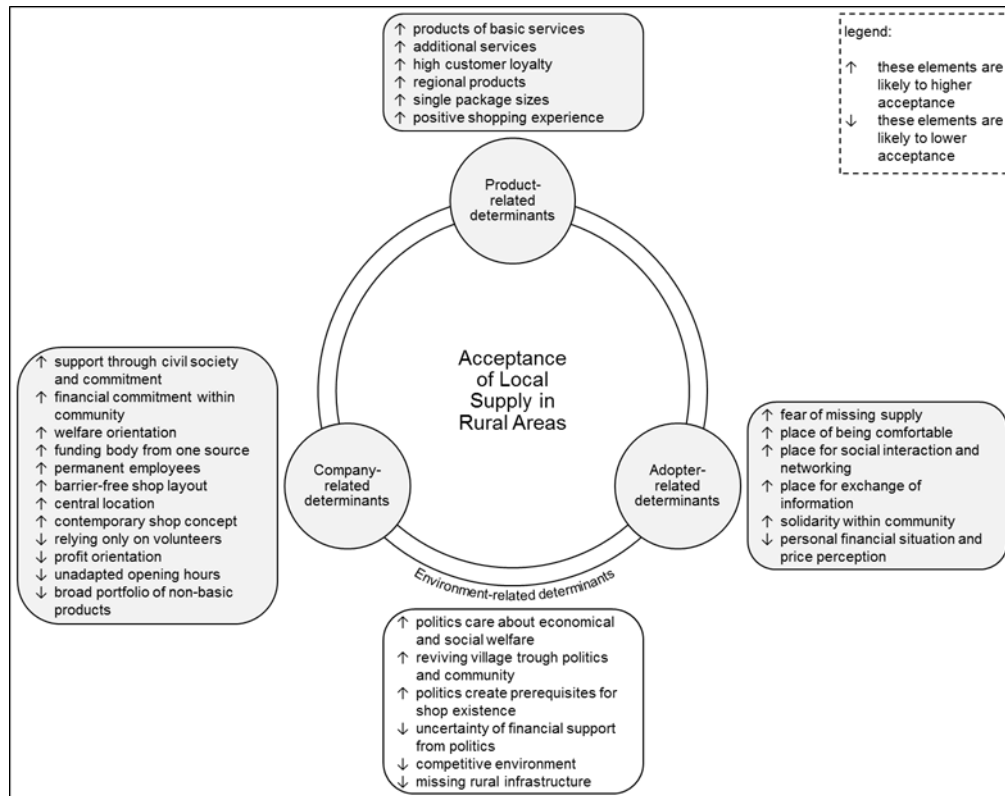


Figure 3. Detailed evaluation grid of requirements and acceptance factors of local supply concepts in rural areas.

Product-related determinants: In a corner shop food products are expected in the first place from the “I”-perspective as well as all personas: from basic foodstuffs (such as pasta, bread, eggs, milk, sugar and salt, butter, meat and cheese, fruit and vegetables) over (alcoholic) beverages to luxury consumables (e.g. candy, tobacco). Furthermore, a small refrigerated counter with frozen products (e.g. pizza) and a shelf with canned food should be available. But even a basic need for drugstore, sanitation and office requisites (such as toiletries, paper handkerchiefs, toilet paper and laundry soap, magazines, greeting cards or stamps) should be supported. But there are some expectations that are persona specific: just the persona of the teenager could ask for contraceptives, the hairdresser with her child on the other hand baby products such as diapers. From the perspective of the grandmother also tickets for the bus (much more personal than a ticket terminal), flowers, knitting/sewing accessories, animal food and small gifts for her grandchildren would have to be re-purchasable. The size of the products should be usable for all households; food that is not packaged is preferred. Inferior goods are excluded. Electrical appliances, clothing, shoes, fashion jewelry, home improvement articles should not be sold. Also non-prescription pharmacy products were mentioned especially for elderly people as well as personas with children. A pharmacy itself, however, consistently was excluded due to legal issues. But as a special service of the corner shop, a pharmacy pick-up and delivery service could be offered within the corner shop. It would also be useful if the shop includes a post office, information corner about and products from farmers of the region and a coffee machine. Offering additional services could higher the attractiveness of the corner shop attractive for many people, e.g. through home delivery of products in the form of pick-up and delivery services or bringing people to the store via bus connections. Especially people without a car or limited mobility can benefit from this. Furthermore, the possibilities of the internet can be integrated: orders can be made over the internet (as well as on the phone) to avoid a high stock of goods and orders can be picked up upon arrival. Also transmitting events of the store could be possible. Especially for people with levels of care, this would be a way to maintain contact in the world outside. There is a need for different actions inhabitants can actively get involved. For example, pre-Christmas cookie baking, baking in general and reading evenings were named. Also, the possibility of using a secondary space for events and courses within the shop was mentioned.

The aspect of the regionality of the products was very significant for every participant: the offering of products from the specific region could represent a differentiation character (e.g. homemade jams and cakes, farmer products from the surrounding area). But it was criticized that having everything in one appears difficult to implement. Focusing on the supply of products of daily use is significant. Especially from the persona perspective of the father, it is useful to buy basic items he forgot to buy in large supermarkets.

Adopter-related determinants: Not only food supply and services play a role: the participants in the majority agreed that the corner shops are perceived as a center of communication, a place of well-being with an atmosphere of trust and personal encouragement. Anonymity should not exist there. Rather, it is a place that brings people together and is kind of a village center. The already existing concepts of baker busses or butcher cars are important, but they would

not fulfill the aspect of informing, sharing and communicating and that is why they do not contribute to a vibrant village life. The opportunity to interact communicatively and socially through a kind of small coffee and pastry corner with seating is very attractive, especially for older residents. Also, the presence of a notice board, as for flea markets, neighborhood help, sharing and event information is considered significant: only a strong village community is viewed as a prerequisite for the success of such a store. The desire for longevity of the store is particularly pronounced: the fear of missing supply is profoundly. The workshop participants would avoid a store, when it is much more expensive than discounters. It was feared that due to the small size of such a corner shop each product would be very expensive, due to minimum order quantities. The individual financial situation is important, too: no citizen should ever be excluded by the prices from “Aunt Emma”.

Company-related determinants: Regarding company-related determinants, the most important aspects mentioned were: ownership, human factors and shop design. From a business perspective there was skepticism among workshop participants regarding a realization of the ownership. From a financial point of view, Cooperatives are very interesting. The aim of such a concept has to be viable on its own: without profit it is not worth it. There was generally agreement that there must be a person who assumes managerial character and exaggerates the concept: whether public or private. A person that takes over initiative. At the same time one has to find the balance between profit and human factors: such a store concept only exists by taking into account the common welfare of all inhabitants. The inclusion of the entire village community is essential – and can secure the business survives in the long term. People can make their contribution to the store offering their different skills: such as marketing knowledge or artisan activities. This is an excellent work with volunteers. Without volunteers it will not be feasible. But the concept should not be based only on voluntary work. It takes at least one permanent employee resistant in case of losing (all) volunteers. In addition, hourly time sharing models can be used. Mothers, socially disadvantaged, young people and families - each person can be included. In this way, intergenerational work can be realized which is indispensable for a vibrant village community. Even official honors of the local municipalities are to be considered. The accessibility of the store must be ensured, i.e. suitable for walker-rollers and prams. A central location in the village is preferred, so that everyone has short paths. However, a viable operation of the store is only possible if the respective place has a certain size in order to ensure a customer base. The opening hours of the corner shop have to be adapted to the peculiarities of the villagers: during the week 7-13 o'clock and 15:30 to 20 o'clock to accommodate the returnees to the village. Saturdays the store should be open from 7 to 13:30 o'clock and on Sundays after church.

Environment-related determinants: Based on the environmental point of view, the important role of community or even the local administration was mentioned. Special financial support and funding for village renewal and recovery could be a way to receive the concept of corner shops. It could also be operated by community itself which also has the responsibility to secure and expand infrastructure. A official recognition by communities for the involvement in corner shops is of particular importance (e.g. in the form of certificates or appreciation). A kind of store management is conceivable, which is suspended in the administration of the municipality itself. From a market perspective, corner stores cannot compete with the big supermarkets. But they do not need to do this, if they can prove their own perceived values and benefits: they are more than a supermarket: they are vibrant village centers with an important social factor.

Summary: A corner shop is very suitable as a local structure to provide a basic supply of goods and services in rural areas. But to do this, it is necessary to develop itself from a pure product provider to a service provider. The concept of “Aunt Emma” should not have a too narrow perspective – that was the major demand of workshop participants. The corner shop has to be used as a starting point of further developments in services and products. Furthermore, setting up such structures of the village centers is not easy. Experts are needed who have the appropriate expertise for designing, developing and implementing local and internal structures of such a supply concept. It would be, for example, advantageous to have a focal point which bundles these activities such as district offices. The required knowledge is very comprehensive and special: tax, accounting, labor legislation, liability and insurances as well as health certificates just to name a few. This is the reason why development of practical guidelines is necessary: e.g. a kind of checklist, which includes the essential aspects to be observed. It should be noted that such a guideline cannot be seen as a patent solution since the specifics of the respective localities must be considered. Every community has different characteristics that need to be considered.

5.2 Outpatient medical supply for people in rural areas

5.2.1 Six health care concepts reflected by the workshop participants

Six concepts, which are already mentioned in German policy considerations, were intensively discussed by the workshop participants.

Temporarily occupied practice: The participants suggest to offer flexible consultation hours in temporarily occupied practice (e.g. in the evenings) and to ensure the accessibility within walking distance for the village people. The cases of acute and chronic diseases are seen as problematical because they do not appear during consultation hours. A mutual trust in the contact between doctor and patient should also be existent. During the brainstorming of ideas, the participants also suggest that the community should provide practice rooms or ensure rotating physicians for the medical supply of rural areas.

Mobile medical practice: The possibility of a car with special equipage (ultrasonic system, lab, X-ray apparatus) is special. Though the full service provision is not be ensured, focusing on basic medical care is given. The arrangement of queue times in front of the car is to be seen as a problem. A lack of flexibility is also be criticized by the participants. The persona of the 78-year old lady with limited mobility should also have the possibility to receive home visits by the doctor with this car. In any case the car should come to the patients, because the mobility problems of patients should not limit consultations.

Community nurse: Already during the brainstorming part, the participants suggest that a doctor's assistant can be a trustworthy person that could support the provision of general medical care if a doctor is not on site. A community nurse is responsible for pre- and postcare, medical monitoring, supply of medicines and for medical counseling but is limited in the therapy of patients. She offers visitation services. Primarily the persona of the 78-year old lady, the community nurse is a grateful concept. She would use the concept more because she has the possibility to stay in contact with the outside world. Moreover she could hold conversations with the nurse. Hence, the care is most important. However the scope of action of the community nurse and her missing medical apprenticeship are seen as big complexes of problem by the participants.

Pick-up and delivery services: This concept is seen critical by workshop participants due to unclear financing and a high organizational effort. For the improvement of mobility, transport services like collective taxis or carpooling to consultation hours should be considered.

Telemedicine: The possibilities of remote diagnosis and the transmission of health problems and consultation hours via internet were discussed controversial. Telemedicine is more seen as an instrument in case of emergency or an auxiliary tool. Problems concerning technical handling (support is needed), perceived anonymity and a lack of mutual trust are mentioned. Moreover haptic checkups could be missing during the anamnesis.

Medical center in a neighboring village: The mobility of patients is in the foreground of this concept. Good connections to public transportation, the organization of neighborhood help arrangements or the possibility of home visits by the doctors are facts that should be given. Mainly the persona of the 78-year old lady is dependent on aid of her children or a good connection to public transportation to reach the practice in a neighboring village.

Further suggestions: There have also been further suggestions by the workshop participants that were not covered by the listed six concepts: it was important to have at least a minimum level of medical supply in the community for example by flexible practice hours in various forms: two to three times per week by phone or internet. Specialized training such as the use of home remedies or first aid (dealing with the defibrillator by volunteer fire department) were mentioned. A desire for advice in case of illness was crucial for the desire of having a local pharmacy - an internet pharmacy would not be sufficient. Another approach could be the existence of a health care manager who knows the community structures and its residents. He/her organizes transport services (e.g. taxi-orders) and supplies the local inhabitants with important information. The mayor and the municipality should fund and support this.

5.2.2 Requirements and acceptance factors for medical supply

Due to the specific statements on the individual concepts, it was possible to derive the determinants by Kollmann (see Figure 4).

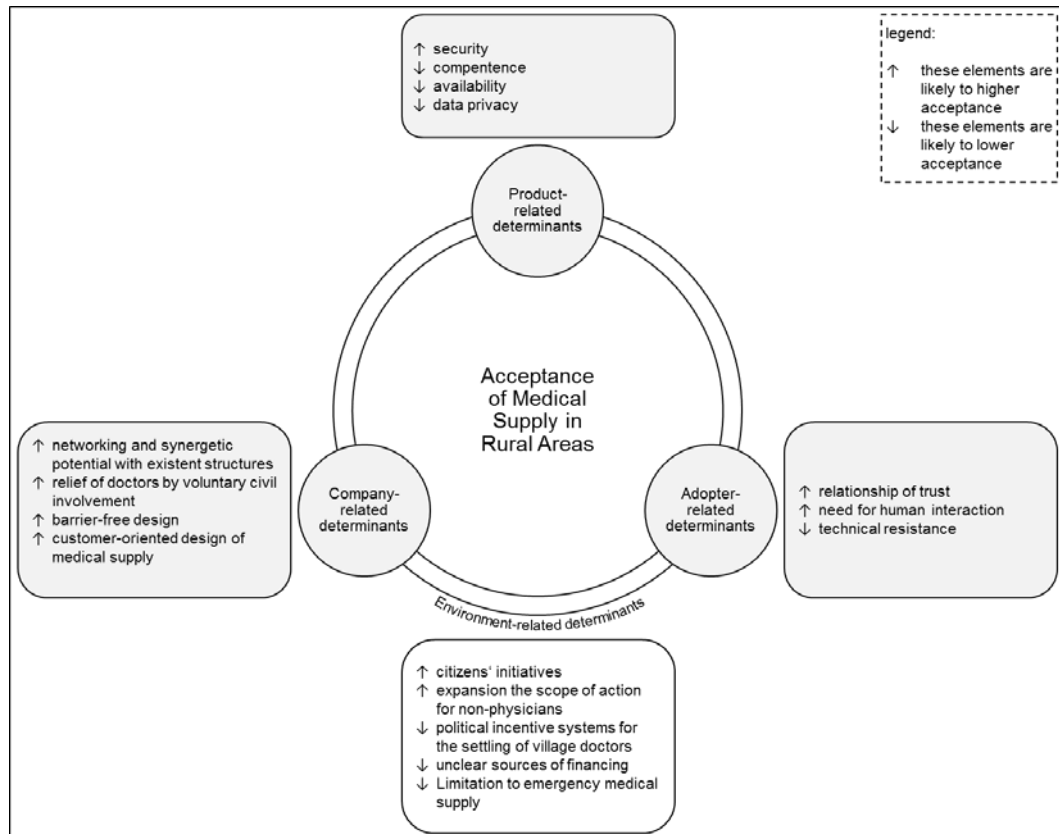


Figure 4. Evaluation grid of requirements and acceptance factors of health care supply concepts in rural areas.

Product-related determinants: The physician's know how is very important to the workshop participants. Inadequate treatment should be avoided by professional experience of the physician and a good previous education. Furthermore, the physician should constantly perceive training to be always in line with the current status of research. Furthermore, a full-time availability of a physician at least on certain days a week is important. This implies clinic organization and low latency, adapted to the habits and needs of the inhabitants. Health care should be guided by the needs of the individuals. Also, the aspect of data protection was noted by the participants. The fear of data misuse in a technical or scientific way must be considered. Safety aspects regarding the use of medical services have to be observed, for example in case of failure of house emergency call services. This also includes that quality of individual health services plays an important role especially in the technical field.

Adopter-related determinants: A trusted relationship to the attending person is most important. In particular, a need for a trusted sympathetic person is expressed, a special desire for detailed explanations of the disease and responding to personal needs. There should not be a sense of distance. The treating person should act as an attentive listener regarding disease history, family and knowing the personality of his/her individual patient. In particular, a frequent change of the treating person is not wanted. The need for human interaction is thus related. For example, telemedicine is not a replacement of the doctor. The technology readiness is a very important aspect regarding the use of technology in health care such as telemedicine. Some patients are getting used to it others feel fear and reject it. Especially elderly people feel fear of doing something wrong with the device. A direct interaction with a doctor is desired; an interaction via internet is seen quite skeptically.

Company-related determinants: A discharge of the physician by civic engagement was mentioned by the participants, e.g. through helpful neighbors and driving services. This could be established by the local community or church in order to organize the trip to the doctor. Nevertheless, the rideshare opportunity is seen rather critical because there is given a risk of infection. The customer-focused design of the place of health provision was important to the workshop participants. Especially regarding the mobile medical practice, the waiting area should be pleasant and independent of all seasons. Especially accessibility must be ensured, for example, with the establishment of space for walking aids or lifting aids. Furthermore, networking potentials and synergies with existing structures should be intensified, e.g. with home care service like Caritas and Diakonia.

Environment-related determinants: According to the participants, there must be political incentive systems for the settlement of doctors in rural areas. The community must support the settlement of doctors. Financial support through the municipalities should serve, for example, for the recruitment of doctors and the provision of consulting rooms as well as providing infrastructure (e.g. schools). Furthermore special information should be given to the doctors, especially about the composition of the community population or other doctors in the region. The attractiveness of the medical profession in the country is limited. Citizens could support their doctor by civic initiative for example through

petitions. The restriction on emergency care in place by a hospital outside the community is viewed critically: losing valuable time because of large distances. Also the extension of the scope for medical action of non-medical professionals was mentioned. For example, community nurses have legal restrictions regarding treatment and have to do a lot of paperwork. They could get more tasks and responsibilities in order to support the inhabitants much better. Unclear financing sources are an important obstacle in realizing new health care concepts. According to the participants, especially health insurance should support medical supply much more.

6 Conclusion

6.1 The key role of civil voluntary engagement in social innovation

As all workshop findings indicate: civil voluntary engagement has a significant relevance for the assurance of rural supply services, though it requires general conditions especially the existence of social rooms. Active local co-creators and empowered citizens are seen as an opportunity for designing functional and attractive villages in the future. In order to involve more citizens as new players into the field of general interest, legal aspects, possibilities for decision making financial incentives and professional support are needed as well as a creative collaboration with authorities and government. Successful support of civic commitment therefore is recommended to create structures in the long term, to specifically qualify volunteers, promote commitment of employees of the municipality and to develop an appreciation concept. Another important task is networking of organizations and associations. Modern Internet-based communication structures are essential and recommended. Given the demographic developments, it is important to strongly consider the commitment of elderly people.

By promoting the commitment of these people, their time, resources and especially lifetime experiences can be made available for the community. The increase of elderly in German population is an opportunity to shape the future. Especially given the growing importance of social innovation - this means the development of practice-oriented concept models and methods as well as application-oriented strategies for the conservation and participation of older people in work and social life - this is indispensable. (Future) projects of general interest require connection points in the commitment structure on site. Citizens are increasingly invited to create local infrastructures. For this reason they need a climate of participation and involvement that allows appreciates and supports. In order to activate more citizens, municipalities should create more decentralized structures for a community-based approach on the one hand. On the other hand, one has to motivate citizens as well, so they are willing to improve their microcosm and form their environment actively.

6.2 Limitations and further research implications

Based on the identified problem areas and needs for action, potential solutions have to be identified and a practical review is needed. The results of our workshop give hints which aspects are important and can indicate which aspects should be considered when creating rural supply concepts. Nevertheless it is necessary to repeat these workshops in those specific areas where people and local administrations think about basic supply of goods and services or outpatient medical supply. Especially the implementation of the proposed solutions in local communities plays an important role. Besides the conception in real rural regions, in particular issues of economic exploitation and further studies on the social acceptance of such systems are to be answered. Unanswered questions in relation to the success criteria and problem areas can be clarified by further quantitative analysis as well as through special community field-studies with enhanced involvement of local residents, institutions and political actors.

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Users as effectual innovators: A new perspective into user and service innovation

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This study suggests that effectual logic can be used to understand and stimulate user roles in service innovation. When users' activities are effectual, they are driven by 'acting-to-see-what-goals-might-emerge' logic, rather than specific pre-determined goals. Empirically, the focus is on Internet services. The study analyses whether the use of Internet services such as Kickstarter and Pinterest is effectual in nature and develops a preliminary model of effectual process in the context of Internet service use. The idea that the use of Internet services can trigger effectual thinking and action is explored. The paper concludes with suggestions on how the service provider might benefit from understanding of its users as effectual actors.

1 Introduction: what can we learn from prior literature

1.1 Effectual logic

Effectuation, as introduced by Sarasvathy and his co-workers (Sarasvathy, 2001; Sarasvathy; Dew, 2005; Read; Sarasvathy, 2005) has been developed as a logic of entrepreneurial expertise. It is suggested as an alternative to the logic of predictive rationality. Predictive rationality involves two types of uncertainties or guesses: "a guess about uncertain future consequences and a guess about uncertain future preferences" (March, 1978, 587; cited in Sarasvathy; Dew, 2005, 386). The latter guess or uncertainty is particularly important to the present study: When we aim to understand human behaviour, we usually assume that people know what they prefer (in the future). However, it has been demonstrated that our goals and future preferences are ambiguous, inconsistent, conflicting and unstable (Sarasvathy; Dew, 2005).

The Harvard psychologist Daniel Gilbert has been exploring the nature of psychological mechanisms, which distort our perceptions of the future. In his hugely popular book, *Stumbling on Happiness* (2006), he discusses the many ways in which our mental processes make it practically impossible for us to know now what will make us happy in the future. To give one example: when we try to imagine how we would feel about things in the future, we actually image how we would feel if they happened now. Our mental picture of our feelings in the future will be strongly influenced by our current state of mind. Further, we are not able to imagine all the details that will very much influence the actual experience in the future. Things look and feel different once they happen, which makes our attempts to imagine the future feelings and preferences flawed. As strange as it may sound, because our beliefs about what will make us happy are often wrong, we might as well not invest much energy into thinking and planning of our goals but rather go toward them. As Sarasvathy and Dew (2005, 399) cite the poet Roethke: "I learn by going where I have to go".

Returning to entrepreneurial context, Sarasvathy and Dew (2005) and Read, Dew, Sarasvathy, Song and Wiltbank (2009) have demonstrated that expert entrepreneurs tend to use effectual logic to tackle the uncertainty of future preferences: rather than first defining goals and sub-goals to determine resources needed and action to be taken, effectual entrepreneurs begin with the means available and start doing what they can. The action is not arbitrary, because the expert entrepreneurs use questions such as, 'Who am I? What do I know? Who do I know?', to direct their actions. It can be said that the goals emerge through courses of action, which begins from available means. In their article, Sarasvathy and Dew (2005, 387) argue that "the existence of ambiguous and even conflicting preferences is necessary for the successful creation of entrepreneurial novelty".

If expert entrepreneurs employ means-driven processes to direct their actions, to generate new goals, and finally, to generate innovative market offerings – could service users also employ such a logic to direct their creative endeavours? In other words, do users focus on "what *can* be done, given existing means rather than what *ought* to be done, given existing goals"? (Sarasvathy; Dew, 2005, 388). Not always, but sometimes. If sometimes, when?

1.2 User roles in (service) innovation

Prior literature on user roles in innovation has very much relied on the presumption that goals determine resources and drive action. Most often, when we look into user roles in innovation (in firms or other organisations), the starting point of action is the innovation goal held by the organisation.

Obviously, the firm often first examines user needs and practices in order to specify the innovation goal (Kristensson, 2006, 131; Leonard; Rayport, 1997). The idea is that new service development begins with new insight into user needs, which helps to specify the innovation goal and resources needed for the development project.

The innovating firm may also directly engage users into its innovation activities. Here the firm typically defines goals for co-operation: for instance, users may be invited to participate to provide feedback in various stages of the

development project, or to provide a special resource such as technological expertise or testing facilities for development (Kuusisto et al., 2013a).

The goals for co-operation in innovation may also be, and some argue that they should be, co-created with the users: Lundkvist and Yakhlef (2004) stress that goals for new service development emerge through dialogue between the service provider and the customers. Jaworski and Kohli (2006, 111) argue that “the voice of the customer (what the customer would like the firm to do) must be co-created.” Jaworski and Kohli (2006, 112-13) further explain that in a true co-creation dialog between the firm and the customer, the end point of conversation is relatively unclear; ideas develop when one partner says something that triggers another idea in the other partner’s mind, and so on. Such co-creative dialog bears a likeness to effectual reasoning: goals develop in the process of dialog. However, even in a productive co-creation dialog as described by Jaworski and Kohli, the focus is on specifying what should be done, on customer-needs identification, rather than beginning with the means available as a way of creating new goals (effectuation).

In contrast to the above, in user innovation literature, it is the user who has the goal: the user is facing a specific challenge to be solved, which motivates his or her actions (von Hippel, 1988; 2005). User innovators expect to benefit from their innovation effort by using the innovation themselves (von Hippel, 2005). There is good empirical evidence that user innovation driven by the need to solve a specific challenge takes place (Kuusisto et al., 2013b). User innovators are primarily innovating outside of interaction with firms. However, many firms are encouraging and directing user innovation activities to later build on and commercialise user-generated innovations.

Overall, prior literature on user roles in (service) innovation implies a logic that goals are first identified and specified to direct innovation effort. The opposite, effectual logic, according to which means are given and they direct the search for possible effects (goals), is emerging in studies emphasising co-creational aspects in innovation (Lundkvist; Yakhlef, 2004; Jaworski; Kohli, 2006). A good empirical example is provided by Coviello and Joseph (2012, 94): They describe how the opportunity recognition in cases in which customers contributed to successful major technological innovations could be best described as “ongoing co-creation of opportunity” as customers and the firm interacted over time.

Another stream of literature that refutes the idea that goals need to precede innovation activities is provided by studies examining innovation in knowledge intensive business services (KIBS). It has been found that *one way* in which service innovations in effect emerge is the inverse of the traditional ‘idea-development-implementation’ model. Toivonen and Tuominen (2009) describe this practice-driven model of service development as a process that does not start from idea generation at all, but the idea is found subsequently to the implementation of a new service. Such practice-driven development, where the service is produced step by step together with the customer, and its innovation potential is observed only afterwards, shows that innovation is often intertwined with the actual service process in KIBS (Sundbo; Gallouj, 2000). Hence, innovation process can start without any conscious innovation goal.

In the present study, the focus is on users as effectual innovators. We assume that users may be creative and end up generating innovations driven by ‘acting-to-see-what-goals-might-emerge’ logic, rather than any specific innovation goals in mind – as opposed to user innovation literature (von Hippel, 2005). It is interesting to note here that even though in user innovation literature a specific innovation challenge is very much the starting point of the innovation processes, Raasch and von Hippel (2013) have recently examined another type of (user) innovation driver: participation value. Participation value refers to the value that the engagement in innovation activity itself can entail: enjoyment and learning, social stimulation, and feelings of personal satisfaction derived from contributing to a good cause. Though this characterisation does not directly support effectual logic, it takes into account the fact that users’ innovative behaviour is not necessarily driven by the pursuit of a specific innovation outcome, but may rather be driven by the process itself as a valued experience.

Next, we will start to develop a model of effectual process in the context of Internet service use. The following section first describes the case material that will be used.

2 Effectual process in the context of Internet service use

2.1 Empirical data

The case material is based on user interviews and user generated material on selected Internet service sites. In addition, business journal articles discussing features and user behaviour on various (social) Internet service platforms provide background material. In particular, user interviews, discussions, comments on the following Internet services sites (blogs) have been examined:

- Kickstarter – American-based crowd funding platform for creative projects,
- Pinterest – American-based Internet service where visually attractive ‘pin-boards’ are generated by users to collect and share their interests,
- Dreamdo – Finnish-based Internet platform, which encourages users to develop visual content of their dreams and get encouragement and help from others.

All these platforms rely on user-generated creative content, and thus, involve creative engagement from their users. However, the sites may also be used to follow what others are creating. Hence, users may be generating content to the

site, following and commenting on what others are doing, providing help and advice, and even funding to interesting creative projects (funding refers particularly to Kickstarter, which has a multi-sided business model with project creators and project backers).

The role of the empirical data is to help develop the preliminary model of users' effectual process in the context of Internet services. The role of the empirical data is to *illustrate the reasoning*: the short excerpts from user interviews and user comments will show that effectual thinking patterns and behaviours can be found among users of these services. However, this data does not show that such effectual behaviours would be common, nor does it yet show that innovations (to the service provider) are produced as a result of users' effectual processes.

2.2 Thinking effectually and behaving effectually in the context of Internet service use

We develop a model of effectual process in the context of Internet service use based on literature and empirical data on user experiences on the Internet service platforms presented above.

The first assumption is that users often have rather general aspirations as they use Internet services – such as need for diversion and social interaction. This assumption gets support from prior research literature and from the empirical data as discussed next.

Studies that have examined gratifications people seek from media use (Palmgreen et al., 1985; Lee; Lee, 1995), show that users often describe their media use in terms of rather general intensions, such as, 'to stay on top of what's happening', 'to make myself laugh', 'to be entertained' (Lee; Lee, 1995). The use of service platforms such as Pinterest and Kickstarter can be compared to the use of other media content – indeed, they are partly social media. Thus, the research on the motives of media use suggests that the use of Internet services can be driven by motives such as aesthetic pleasure, emotional or intellectual stimulation, and social interaction.

The most basic distinction between different types of motivation is "between intrinsic motivation, which refers to doing something because it is inherently interesting or enjoyable, and extrinsic motivation, which refers to doing something because it leads to a separate outcome." (Ryan; Deci, 2000, 55). It is logical to assume that effectuation processes take place when the use of the service starts with predominantly intrinsic motivation, that is, when the person *is moved to act* for the fun, for the challenge, for the feelings entailed, and not for any specific instrumental reasons that the action is expected to result in.

Accordingly, we suggest that the trigger of action, the trigger of effectual use of Internet services, is intrinsic motivation. This is the first step in the effectual process model presented in Figure 1. The following quotes of Pinterest user experiences illustrates this:

"For me it's actually a diversion. When I feel a need to step away from my work routine, I often turn to Pinterest." (Kary Delaria, Pinterest user. Interview on <http://www.arikhanson.com/2011/12/13/whats-behind-the-pinterest-craze-15-super-users-share-their-thoughts/> . Accessed 12.6.2014)

"I like logging on to Pinterest and admiring the beautiful pins for the boards I follow. It's like window shopping for all my interests at once!" (Mariam Shahab, Pinterest user. Interview on <http://www.arikhanson.com/2011/12/13/whats-behind-the-pinterest-craze-15-super-users-share-their-thoughts/> Accessed 12.6.2014.)

The following two quotes from Kickstarter backer interviews (backers help to fund creative projects introduced on the site) highlight the importance of social and emotional stimulation, and the emotional reward from participation:

"The biggest thing for me is actually feeling that you're part of something. ... But here there's a sort of weird and lovely magic of, I'm part of this, I helped create this, this exists because of me, isn't this fun!" (Neil Gaiman, Kickstrater backer. Interview on <https://www.kickstarter.com/blog/meet-a-backer-neil-gaiman> Accessed 10.6.2014.)

"The best thing is definitely getting to follow along as the project goes forward. You get an inside view of the process, and feel like you are part of the team, having helped make the final product happen." Espen Arntzen, Kickstrater backer. Interview on <https://www.kickstarter.com/blog/meet-a-backer-espen-arntzen> Accessed 10.6.2014.

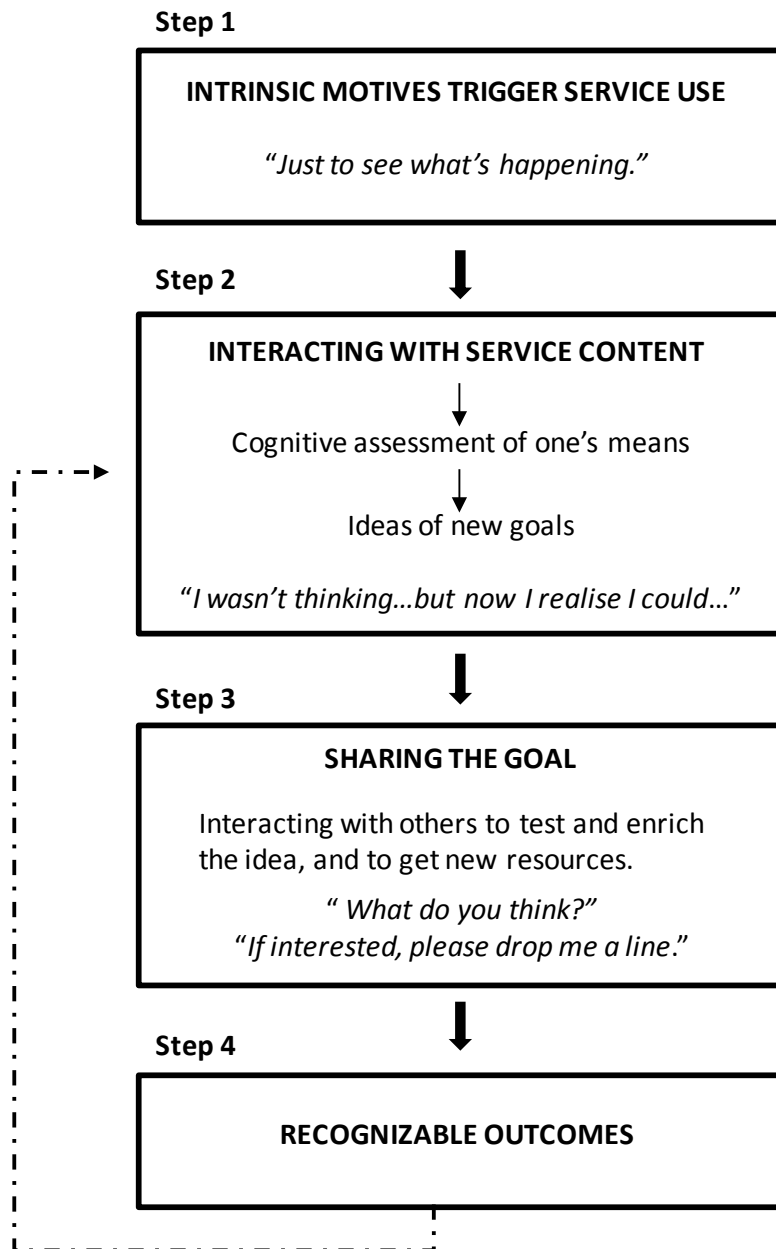


Figure 1. Effectual process in the context of Internet service use. Adapted from: Read et al. (2009), and, Fischer and Reuber (2011).

The second step in the suggested process model is when the user actually starts interacting with the service content: skim over, read, comment, copy material, and so forth – to check what's happening now, how the project one has followed is developing, what's new, who's on the site, and the like. We argue that it is this actual interacting with the service content that will trigger the assessment of the user's means in his or her mind.

When Sarasvathy and Dew (2005) describe the nature of effectual process in entrepreneurial context, they argue that the process starts with the entrepreneur assessing the means available to him or her, by considering questions such as, Who am I? What do I know? Who do I know?. Using the Internet service almost inevitably leads to some reflection of one's means available, which may lead to new ideas of what one could generate with these means: 'What (else) could I do?' (also, Fischer; Reuber, 2011, 5).

With all our knowledge and experiences we simply cannot avoid generating new links between what we already know (and what will become activated in our mind) and the new stimuli we encounter (in cognitive psychology, new knowledge always becomes linked to some existing knowledge). In real life, we all are very familiar with the following type of reasoning: "I wasn't thinking... but now when I see this / you mention this... I realize that..." Accordingly, we propose that the assessment of means, central to any effectuation process, is very much intertwined with actual use of the service. New insight into one's means can lead to new ideas, to the generation of new goals, which the person did not imagine when starting to use the service site. This process may be very fast and take place in seconds, or it may be a longer one as exemplified next.

The first quote, is from the study by Fischer and Reuber (2011, 1), in which they examined “how effectuation processes are impacted when entrepreneurs adopt Twitter.” We reuse this quote from their interview material, because it provides such an excellent illustration of how the user’s following of others’ tweets leads him to recognize the means he has available and understand what he might achieve with his means:

“.. And I wanted to see the way that people were doing it. And so I sat on the sidelines for a couple of weeks. And then I started to find my voice. I realized that I read a lot and I’m exposed to some interesting things and I’ve got some interesting thoughts. Why don’t I put them up here and see what people think. And from there I’ve gone from zero followers to about 425 people that follow [Company] on Twitter now.” (Source: Fischer and Reuber, 2011, 8: excerpt from an entrepreneur interview.)

The following quote from a Kickstarter user interview gives another example of how spending time on the site, having interest in what others are doing, and learning from the others, makes the person assess his means anew (here as a creator of a graphic novel), which results in the emergence of a new goal for the person:

“After seeing that it was possible, ..., it was only a matter of time before I got the idea fixated in my head that I COULD and WOULD do this.”
(Trevor Charles, Kickstrater backer and creator. Interview on www.kickstarter.com/blog/backer-becomes-creator-trevor-charles-makes-a-grap Accessed 10.6.2014.)

The next quote exemplifies how a Pinterest user realized that her leisure usage of the service site can be useful in her work role as well:

“For instance, we recently provided some strategic guidance to a company that produces hand-crafted jewelry and I suggested taking a look at Pinterest as a means of sharing visuals of her designs. If you have a retail product line with great visual appeal, there’s likely a large group of “pinners” who will love to see your wares.”
(Kary Delaria interviewed on <http://www.arikhanson.com/2011/12/13/whats-behind-the-pinterest-craze-15-super-users-share-their-thoughts/> Accessed 12.6.2014)

Step 2 in the model, in which the user is interacting with the service content and a new goal is emerging, mainly refers to the cognitive component of the effectual process – thinking effectually (Fischer; Reuber, 2011). Next, we develop the idea of how the service user is behaving effectually. We propose that social interaction plays a major role here. In many Internet service sites, and not only in social media that focus upon networking (Facebook) or sharing of user-generated material (Youtube), interaction with other users is a key feature of the service. The two Kickstarter quotes underline the importance of the social dimension of the site:

“What if somebody out there is into it? What if a lot of people out there are into it? Kickstarter is wildly important. It’s not just a funding platform, it’s a testing lab for a new way of living.” (Lauren Krakauskas Kickstarter creator. Interviewed on <https://www.kickstarter.com/blog/ten-creators-one-question-what-did-you-learn> Accessed 10.6.2014)

“On Kickstarter you have the attention of people who want to believe, who want to help make something great come to life. That’s a one of kind opportunity. If you can’t connect to that audience then there’s no hope when you are in the real world..” (Coulter Lewis, Quinn Popcorn creator. Interviewed on <https://www.kickstarter.com/blog/ten-creators-one-question-what-did-you-learn> Accessed 10.6.2014)

Being able to easily interact with a great number of people, often from diverse walks of life, offers great opportunities for getting encouragement, feedback, advice – even partners and other resources for the endeavour. Very often, users start going toward their new goal by asking: ‘What do you think?’, or, ‘If you’re interested, please drop me a line’. Putting one’s idea for everyone to see to get feedback and other resources, is an important element of many Internet services. For instance, the service provider Dreamdo makes this feature of its service explicit when explaining ‘What is Dreamdo’:

“The best way to get inspiration and courage to pursue your dreams comes from following different people and brands doing exciting things. It works the other way round too: people anywhere in the world can follow your public dreams and offer help.” (<https://dream.do/en/about> . Accessed 18.7.2014)

Let us keep in mind that a person thinking effectually has not taken up to solve any specific challenge, but rather gets inspired along the way by what he or she now perceives as an interesting opportunity. It can be speculated that in such a situation the emerging idea is open to redirection: the person may be more willing to use the diverse knowledge and perhaps other help offered by people than if he or she had come to the site with a ready idea in mind. Elsewhere, such openness to experience from diverse sources has been shown to increase the probability of success of the innovative outcome (King; Lakhani, 2013). Sharing with others what one has in mind, and letting the committed others to further

shape the idea and the objectives for action is a typical response to environment by a person acting effectually (Sarasvathy; Dew, 2005; Read et al., 2009). This also seems to happen in the Internet service sites we examined:

“Michael Davis decided to make a version of the opening shot from the old Monkey Island game, where each pixel would be a Lego brick. ... It was exciting to follow the updates, from the beginning where it was just a guy with a cool project that might happen, through a sudden Twitter storm from famous game makers, and eventually he had a wall mural of 64,000 plastic bricks.”

(Espen Arntzen, Kickstarter backer. Interview on <https://www.kickstarter.com/blog/meet-a-backer-espen-arntzen> Accessed 10.6.2014.)

“We’re always talking to our community, and Kickstarter got that all started. Some of the folks on our team were our earliest Kickstarter backers.” (Sam Jacoby, Form 1 creator. Interviewed on <https://www.kickstarter.com/blog/ten-creators-one-question-what-did-you-learn> Accessed 10.6.2014)

“My favourite lesson is that if you believe in people a little, they believe in themselves a lot.” (Jay Silver, MaKey MaKey creator, Interviewed on <https://www.kickstarter.com/blog/ten-creators-one-question-what-did-you-learn> Accessed 10.6.2014)

Accordingly, in step 3, we propose that social interaction with other users on the Internet service site plays a key role in behaving effectually. Sharing the emerging idea, getting comments, advice, possibly committed partners and their resources along the way, helps to enrich and/or refine the idea and turn it into action.

The last step, recognizable outcomes of the effectual process may have various manifestations: in the Internet service sites we have looked into, from the point of view of the service users, they may be books, charity projects, innovative devices, travel projects, acquired new skills, new friends and relations, etc. Naturally such recognizable outcomes will lead to some re-assessment of the means (thus, feedback link from step 4 to step 2, Figure 1). From the point of view of the Internet service provider, these recognizable innovative outcomes might be, linking the service with other services, suggesting or adding new user groups or functionalities to the site, introducing new ways of making use of the service, and so forth. We will discuss the opportunities of the Internet service provider to benefit from effectual user behavior in the concluding section.

2.3 Can Internet services trigger effectual thinking and action?

Above we have introduced the possibility that the use of digital services itself may trigger effectual thinking and action. To our knowledge, this effect has been hardly examined. One exception is the study by Fischer and Reuber (2010): They got support for the argument that social interaction via Twitter can impact effectual thinking – how the entrepreneur assesses the means she or he has available and identifies the effects that may be generated with these means. But the idea that the use of (social) Internet service itself can trigger an effectual thinking and action process, though intuitively attractive, deserves further exploration.

In Figure 1, developed to characterise effectual thinking and behaviour in the context of Internet service use, we propose that *the stimulation provided by the service content* makes the user reflect upon his or her means and can lead to the identification of new goals for the person. Further, we propose that *social interaction*, which is a key element in many Internet services, helps the user further redirect the course of action, and often, quickly turn the idea into action with the support by interested others. Indeed such fast experimentation with even rough new ideas to get feedback and support from interested others has been argued to be key to innovative behaviour (Kelly; Kelly, 2013) and an essential feature of effectual behaviour: As Read and his co-authors (Read et al., 2009, 3) summarize (in an entrepreneurial context): “Share what you have with committed partners because relationships (particularly with shared rewards) shape the trajectory of the opportunity.”

Two characteristics of Internet services, in particular, are likely to contribute to effectual thinking and behaviour: first, many Internet services are themselves ‘means-oriented’, and second, many Internet services build a sense of community among their users.

First, many Internet services are themselves ‘means-driven’: the service idea is to help users collect, demonstrate, share, accumulate their resources in new ways, which may lead to new insights and the emergence of new goals (e.g., Pinterest, Dreamdo, LinkedIn, Scrapbook). Overall, (social) Internet sites can be seen as huge networks of people’s resources, which create great opportunities for creative associations and serendipity. A good example here is LinkedIn (www.linkedin.com): It is a social networking website for people in professional jobs, via which users can make connections with other professionals, share their profiles, look for jobs – and employers look for potential new hires. Though its use may be basically goal directed, for instance, to look for a new job, the use can also be described in terms of general intentions, such as, being visible and connected to others in a meaningful professional community. Such general aspirations leave room for effectual processes to take place (Sarasvathy, 2001). It is most interesting to note that the structural organization of the service – the site is organized under the headings of Profile, Connections, Jobs, Interests – directly helps to answer the questions at the hearth of effectual thinking (Who I am; What I know; Who I know) (Sarasvathy; Dew, 2005).

Second, an essential element of many Internet services is community features. Users may join user communities and special interest groups or set up new ones. Being an active member of a group of people sharing some interest(s) is also a way to build one's desired identity. Explaining actions in terms of one's identity, rather than in terms of expected consequences, is characteristic of effectual reasoning (Sarasvathy; Dew, 2005, 393).

The service providers often provide (peer) recognition tools, which further support the user's desired identity. TripAdvisor (www.tripadvisor.com), perhaps the most popular travel site today, which provides user-generated reviews and interactive travel forums, illustrates a well developed user recognition system: With every user generated review (of a hotel, restaurant, etc.), the number of reviews the user has made and the number of reviews that have been rated by other users as helpful, is shown. TripAdvisor further recognizes active reviewers by giving them different types of star badges (online) based on the number of reviews users have posted. One can also have a look at the reviewer's profile, which, for instance, shows on the world map how many cities the person has visited, how many miles travelled (naturally based on the data the person has shared on the site). This public recognition is an intangible reward to the contributor, but public recognition is also essential in building one's identity: 'I'm the type of person who likes to help people do worthwhile things.'

Above, we have just scratched the surface of the idea that some features of Internet services stimulate effectual processes in their users. The means-oriented, scrapbook nature of many services can trigger the assessment of one's means and stimulate the generation of new associations and new ideas. The easiness of engaging in social interactions and the related possibilities to build one's identity and to get committed partners can increase the person's willingness and ability to try out the new ideas.

3 Conclusion

3.1 Implications for the Internet service provider

We have developed the idea that users may engage in effectual thinking and action as they use Internet services, and that some features of (social) Internet services can stimulate effectual reasoning and actions. How can the service provider benefit from the understanding of its users as effectual actors?

We suggest three general strategies by which the Internet service provider might benefit from the creative activities of effectual service users:

1. Improving the service experience by supporting users' effectual behavior.

The logic here is simple: We are all creative and creative endeavors are inherently satisfying. The service provider can further enhance the creative service experience by facilitating and stimulating users' effectual thinking and action processes on the service site. The innovative Internet service provider might create new tools or service features to stimulate the effectual process outlined in Figure 1: for instance, to encourage user assessment of means available, or to facilitate sharing of resources between the users.

2. Learning from the creative users and formalizing innovative service features.

Sometimes user actions on the site suggest new features to the service. In particular, when the service relies on user-generated content, the users very much impact what the service looks like or is about. For instance, users may create new uses for the site and attract new user groups. These new 'innovative ways', which emerge as a result of creative user actions, may be recognized as possible new service features, which need to be formalized by the service provider in order to take full advantage of them. The service provider needs to be alert and responsive to developing its service based on user generated creative outcomes.

3. Using the effectual logic to unblock creative energy in the service provider organization.

Finally, the service provider organization might benefit from imitating the means-driven action logic in its own innovation system. For instance, some firms do allow their employees to work on their own projects some part of the working time. The innovation implications of a model, which relies on employees' own means-driven creative processes need to be demonstrated. In any case, adding opportunities to the unexpected while inspiring own employees is an exciting option.

3.2 Directions for future research

Indeed, it would be strange if new ideas and creative outcomes would not be generated when a person is intrinsically motivated to engage in the production and diffusion of online content. Being playful and curious, acting on one's inherent interest without anticipating specific outcomes, is an important feature of human behaviour, learning and creativity (e.g., Ryan; Deci 2000), and key trigger of effectual thinking and action. It seems that Internet service sites with user-generated content have great opportunities to encourage such 'effectual creativity' among their users, and the service providers may also benefit from the users' creative activities.

We conclude this idea paper by suggesting three paths for research: First, the argumentation developed in the present paper needs to be tested and further developed with empirical data. The obvious option would be to identify and

examine important innovations (for the service provide; possibly, for third parties), which can be shown to have their origin in effectual user behaviors. Such innovation cases would also shed more light on the ways in which firms can identify and harness the outcomes of users' effectual behavior. Second, the analysis in the present paper has raised an interesting new question about the effectual process: If a new idea is a product of effectual thinking, does this increase the probability that the person will be open to redirecting or further developing the idea with others? In other words, does effectual thinking lead to effectual action? Third, the implications for service providers deserve attention. We should examine what pioneering Internet service providers are already doing to tap the creative outcomes of their service users. Also, the idea of applying effectual logic within the organization's innovation system (or ecosystem) is worth future study.

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The way of public innovation in developing countries: An approach for Mexican local governments

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A big portion of public innovation studies are based in the observation of public organizations in developed countries. Therefore, are their findings equally valid in the context of developing countries' public sector? This paper has a purpose to approach to the answer. The method consists in the analysis of initiatives participating in the Govern and Local Management Award, following a cases-study approach. This contest awards initiatives of Mexican local governments with original design and remarkable positive impact after implementation. Results from observations support the idea that poorly developed institutions often fail in improving from innovation, since innovations requires an appropriate institutional set-up.

1 Understanding public innovation

Innovation is commonly understood as the implementation of something new; a change addressed to obtain an improvement. From many theoretical perspectives it is also traditionally been considered as a normative good; an ideal strategy to bring development and raise benefit (Borins, 2001; Mulgang and Albury, 2003; Vigoda-Gadot *et al.*, 2005). Its economic potential has led to produce a considerable bulk of studies in different sectors of the economy, where efforts have been made to provide a formal definition of innovation in order to help its analysis. Despite efforts for providing a definition of innovation equally valid in all contexts, this has proven to be a highly complex and difficult task (Koch and Hauknes, 2005; Windrum, 2008). The understanding of innovation depends on the activity context under consideration, the analysis built around it and the questions raised on it (Koch and Hauknes, 2005). Therefore, the analysis of public sector innovation requires a definition that attends the nature and the objectives of public sector activities.

After reviewing definitions of innovation in previous public sector focused studies (Koch and Hauknes, 2005; Hartley, 2005; Windrum, 2008; Langergaard and Scheuer, 2009; Matthews *et al.* 2009; European Commission, 2011; Brown and Osborne, 2013) the next elements have been found in common:

- *Newness*: Indeed, an adopted change for being considered as an innovation must show an essential element of novelty, which must be verified at least within the environment of the unit of adoption.
- *Implementation*: In order to be accounted, the innovation must be taken to its implementation.
- *View of innovation as a process*: Innovation ends with implementation but it has to go through a resource consuming process that includes idea generation and development.
- *Improvement*: Innovation is addressed to a specific objective whose purpose implies an improvement (even though this purpose could be finally achieved or not after implementation).
- *Significance*: The magnitude of the improvement and the novelty of the introduced change must be of relevance for the unit of adoption.

On a more technical analysis of the innovation process, some specific strategies are found enabling innovation in an important manner: participation of staff in designing and developing innovations; active involvement of organizations' managers for promoting generation of ideas and giving support to their implementation; rewarding innovative behaviour; allocating resources for innovation; taking advantage of experiences and information sources outside the organisation; making alliances and networks with other organisations and allowing experimentation and evaluation (Borins, 2006; Vigoda-Gadot *et al.*, 2005; Koch and Hauknes, 2005; Mulgang and Albury, 2003).

An organization's willingness to innovate depends significantly on those responsible of decision making being aware about potential benefits of innovation as a strategy of improvement (Borins, 2001; 2006; Mulgang and Albury, 2003; Potts, 2009). Here we have a positive association between innovation outputs, support and engagement of managers and authorities to innovation and resources set to innovation activities, with an emphasis on human resources (employee qualification and participation). It is then believed that Managers' involvement in the innovation process as well as use of resources and employee participation will help to better innovation performance (Vigoda-Gadot *et al.*, 2005; Klein *et al.*, 2009; Potts, 2009; Arundel and Hollanders, 2011).

As for assessment, there are already a few research works that review public innovation relying on extensive survey applications. Some good examples of these are: Innobarometer 2010 survey, funded by the European Commission; MEPIN, by the Danish Center for Studies in Research and other Nordic institutions; and a pilot survey for measuring innovation in the public sector, by NESTA. Also, some other publications use information systematically gathered for that purpose, like in Borins (2006), Arundel and Hubber (2013) and Bloch and Bugge (2013)

2 Understanding public innovation in developing countries

All work reviewed above give a useful insight into the issue of public innovation. However, this is largely based in situations and applications in the context of developed countries. It is common to find in them references to OECD countries, Commonwealth countries (Australia and the United Kingdom, in particular) and western European countries. Therefore, one could reasonably ask: what is innovation about public institutions in developing countries?

Public innovation studies highlight the need for more flexible public organizations that allow for experimentation, waste and failure (Borins, 2006; Potts 2009; Brown and Osborne, 2013), in such a way that the innovation process is enabled. At the same time, there is a claim for reforming public administration, so institutional bureaucratization might not be a barrier for implementing technical instruments and managerial strategies that help for increased efficiency, quality and effectiveness in public administration. This kind of observations recall highly regulated organizations with strong hierarchic patterns of authority and whose views on policy and accountability makes them to avoid implementations that represent a chance of failure. However, what could be expected about promotion and implementation of innovation in organizations that do not resemble the latter?

Expectations for development and improvement make implementation of innovations something desirable at all levels of all kinds of organizations. This is also true for regions where society, economy and public institutions remain at a developing state. Therefore, it arise a question on whether the understanding of processes enabling public innovation – acquired in developed contexts – is the same valid for organizations in developing regions, where weakness of public institutions might place more barriers to successful implementations.

As said before, it is little what have been said about the issue of public innovation relying on evidence from developing regions. Some publications, however, have documented results on the efforts for reforming public institutions and the elements that might have conditioned success or failure. This review let to know some important features of developing public institutions that differ from the context where public innovation is commonly observed and might lead to a different understanding of the innovation process. For example: Samaratunge and Bennington (2002) review the situation of Sri Lanka after a period of reform, Manning (2001) makes an analysis from many developing regions, Arellano (2000) explains the situation of Mexican local government institutions and Cabrero (1997) focus in the case of Latin American countries facing reforms. Their findings are similar in what makes durable sustainable reforms a difficult task.

Even if they are democratic states, it is common that local authorities in developing countries are taken by interest groups that dominate the local stage, which result in discretionary governs that use public administration as a political tool. Thus, articulation of levels of governance that should be given by law and institutionalization of authority is replaced by negotiation between local and central powers (Arellano, 2000). Public administration accountability is an issue in civil servants' discourse; however, without the adequate instruments for citizens' participation and lack of transparency in budget expense, accountability becomes a simulated compliance (Cabrero, 2005; Arzaluz, 2013). Hence, technical guiding is missed in policy planning, execution and evaluation (Samaratunge and Bennington, 2002; García, 2005).

3 The case of Mexican local government

Some deficiencies in Mexican local governments concerning to innovation development can be understood through a revision of the history of political and administrative arrangements since colonial times and after Mexico's independence. Arellano (2000) describes the idea of *patrimonialistic* values at the root of incapacity (or unwillingness) of Mexican municipalities to bear successful reform and innovation. Arellano explains patrimonialism as a tradition continued by those that held discretionary authority and power in local regions since governance was configured during the Spanish colony. According to this, *caciques* and similar forms of local domination have developed the ability to adapt to successive State reforms and keep their privileges: *in patrimonialism legitimacy is kept by tradition and the capacity of dominant groups to present themselves as advocates of a charity ethic (or welfare state)* (Arellano, 2000, p. 116).

The technocratic vision of government administration as a body led by policy planning and oriented to efficient and effective goals is not valid in the Mexican case, where public administration is an instrument for fighting the political arena and public accountability works as an appeal for justifying discretionary decisions in favor of groups and individuals whose collective benefits are not that clear (Arellano, 2002). In this context there is little place for processes – such as innovation – based on technical aspects like planning, efficiency, quality, measure and so.

There is a trend for institutionalize public innovation, framed by theories of change and reform in governmental institutions. Trying to embed these ideas into the context of Mexico's public administration has frequently worked as a mean to reinforce a discretionary way for policy implementation, rather than one guided by technical aspects. In this sense, there is an official speech claiming for change, reform and innovation as objectives for public administration improvement, while reform is carried in such a way that the arrangements that serve to keep a discretionary public administration remain unaltered: "change is for all to stay the same".

Additional to heritage in political uses, lack of social development has led to shortages in institutional development of Mexican public administration. This is even more sensitive in municipalities, with less faculties and resource availability than agencies from states or federal government. Deficiencies of municipal government can be observed in

factors at the operative level, such as: lack of formal education (especially higher education) of employees, high mobility of personnel in public office positions, lack of learned and established proceedings, deficient organization and lack of tools and resources for carrying tasks (computing systems, vehicles, technical support, etc.). Cabrero (2004) details some facts that help to make a picture of institutional under-development of Mexican municipalities. These can be read in Table 1.

Table 1. Lack and deficiencies in Mexican Municipalities.

The majority of Mexican municipalities are characterized by a weak normative and compulsory framework:
64% of the country's municipalities do not even have basic internal by-laws.
Nearly 80% of municipalities do not have regulations for planning.
52% of municipalities do not have regulations for public services.
20% of municipalities do not have strategic planning.
Obsolete administrative systems dominate the municipal scene:
60% of the country's municipalities do not have an administrative area specialized in expenditure, evaluation and supervision.
Almost half of the municipalities recognize having a goal-fulfillment level of less than 75%.
65% of municipalities do not have a Department of Personnel.
Most municipalities recognize having collected taxes and duties 75% below the estimations.
17% of municipalities still do not have a single computer for administrative work.
Mayors and civil servants are of a weak professional level:
18% of local government leaders do not have middle or higher education studies in any professional field.
Half of local government leaders do not have any previous experience in public administration.
Executive civil servants in municipal administration have little accumulated experience in their jobs: 30% have been working in their jobs for less than one year, 55% for less than three years; only 5% have been working for more than five years in their job.
Like local government leaders, half of the civil servants of primary level do not have any previous experience in public administration either.

Source: Cabrero (2004)

Rigid bureaucracies are mentioned in studies on public innovation as a barrier to innovation, since they do not allow for experimentation and 'try and error' processes, needed for successful innovation implementations to emerge. Thus, claims for a more innovative public sector imply the opposite: norms and authorities (managers, directors, presidents and any decision maker) that tolerate certain levels of waste and failure and that encourage employees to come up with new ideas (and take part in their development) in order to let the innovation process to take its way (Borins, 2006; Potts, 2009). To this respect, Garcia (2005) argues:

While the need to make a bureaucratic apparatus more flexible might be a goal in some spheres of Mexico's public administration, in the great majority of the municipalities the need to break the bureaucratic inertia in order to be able to innovate does not exist. This need does not exist because a bureaucratic organization has not yet been developed. (p. 3)... Most local governments have not yet developed an organizational capacity that could even be defined as bureaucratic, nor do they have the necessary technical, organizational and institutional tools to face the expectations and needs of their citizens. (p. 4)

In his work Garcia explains that the lack of systematized procedures and institutional tools in Mexican municipalities is the reason why they are constantly making use of "innovation" as a way to sidestep restrictions and policy challenges. However, these innovations – he says – are no more than *temporary solutions to permanent problems*. They act as a remedy for a lacking *rational structure* and in many times they will not be continued farther than the one period of governance in which they are implemented. Garcia claims that most of innovations taking place in Mexico's local governments do not occur in spite of bureaucratic rigidity but rather because of its absence. He makes a proposition that contradicts typical arguments of literature of public innovation in developed countries: in order to achieve durable higher leveled innovations Mexico's municipalities should regress in the classic sense of promotion of innovation; that is: to promote systematization, solid organizational structures and a regulatory framework that allow for innovation sustainability.

Another inconvenience that Mexican municipalities face towards innovation implementation is the impossibility to combine objectives of efficiency and *govern legitimacy* in implementation of innovative initiatives. Legitimation is

pursued through actions addressed to highlight efficiency and effectiveness of performance and to promote citizen's participation in public policy planning (Cabrero, 1997). However, there is frequently the case in developing countries' local governments, such as Mexico, that actions addressed to improve public efficiency generate conflict and deteriorate government-citizen relations, while actions addresses to improve government-citizen relations tend to counteract public efficiency (Cabrero, 1997).

Focusing in the case of Mexican local governments, reviewed publications suggest some strategies for fixing the institutional weakness of local public administrations and help for effective sustainable reforms and higher level innovations that can actually bring expected development and improvement. These refer to instruments that allow for citizens' participation in favor of an authentic democratic government, increasing transparency in administration for reducing discretionary budget expense, actions for improving competencies of public servants (such as reducing mobility in job places due to change of governance periods and improving levels of preparation and formal education in public servants), establishing systems, norms and processes that can be a reference for operations after every end of governance periods.

Propositions aiming for more flexible chains of authority and a management style that encourages experimentation and is more tolerant to waste and failure, they would be futile in the context of Mexican local governments, where authority relations (from federal to local) are elusive, *experimentation* is the way to go and public accountability does not constraint for waste and failure. A similar situation can be verified in other developing regions (e.g. Manning 2001; Ziccardi, 2004). Therefore, contrary to relaxing solid bureaucracies, promotion of innovation within developing public institutions requires reforms that lead to institutional consolidation and advance in democracy and participation .

4 Mexican local governments in the way for successful innovation

In his work, Garcia (2005) points out differences in capabilities of Mexican municipalities according to their levels of social development. He suggests that some municipalities with certain demographic and development features are closer to *bureaucratic institutions* – resembling those depicted in publications on management reform and public innovation – while others remain in a *pre-bureaucratic* state. His propositions lead to believe that implementation of innovative initiatives is more feasible in big municipalities with higher levels of social development, while small municipalities with low levels of development do not provide the institutional foundations for useful sustainable innovations.

The next step in the analysis is to present some evidence on the achievements of Mexican municipalities towards implementation of innovative governance initiatives. To do so, it is going to be drawn information from the Government and Local Management Award¹⁶¹ (*Premio Gobierno y Gestión Local*). As explained in its own institutional web page, this is a yearly award, addressed for giving recognition to those *programs and local government policies which show a positive and remarkable impact in design and implementation*. Its objective is on *identify, analyze, recognize and disseminate the best local governance experiences in order to contribute to their institutionalization and for developing better practices of management and democracy*. For being considered for award recognition, municipalities should go through the award's submission proceeding by filling in basic information of the initiatives they want to propose. It is allowed that one single municipality proposes multiple initiatives in the same year (and it has been the case that one municipality has obtained more than one initiative awarded). These are recently implemented initiatives and – overall – addressed to improve attention to citizen needs, to solve a particular problem or to enhance local governance. Thus, novelty and significance at unit of implementation are constant elements in initiatives taking part in the contest.

The present analysis is going to rely on information gathered from all participating initiatives between years 2005 and 2011. We count on small briefings (less than one page) providing highlights of each of 2.301 initiatives participating in the award along seven years. This information is going to be complemented with demographic information specifically referred to population size and social development. Measures of social development come from the *National Population Council*¹⁶² (CONAPO). CONAPO offers a measure that classifies country regions and municipalities according to five stages of exclusion¹⁶³ suffered by their population: 1. High, 2. Medium-high, 3. Medium, 4. Medium-low, and 5. Low. Exclusion is revised every 5 years. During the period that covers the analysis, exclusion reports were released in 2005 and 2010. However, in order to keep consistence in descriptive statistics, and given the low rates of change in classification, the classification of 2005 will be defined for the whole seven years period. Likewise, basing on information from the *National Institute of Statistics and Geography*¹⁶⁴, the *National System of Municipal Information*¹⁶⁵ classifies municipalities according to the size and concentration of their population¹⁶⁶: 1.

¹⁶¹ <http://www.premiomunicipal.org.mx>

¹⁶² Consejo Nacional de Población <http://www.conapo.org.mx>

¹⁶³ For an overview of the 'exclusion' technical definition and calculation method see document in http://www.conapo.gob.mx/work/models/CONAPO/indices_margina/marg_local05/libro/IndiceMargLoc2005.pdf

¹⁶⁴ Instituto Nacional de Estadística y Geografía <http://www.inegi.org.mx>

¹⁶⁵ Sistema Nacional de Información Municipal <http://www.snim.rami.gob.mx>

¹⁶⁶ **Metropolis**: more than 50% of population lives in towns with more than 1 million of inhabitants. **Big-urban**: more than 50% of population lives in towns with more than 100 thousand and less than 1 million of inhabitants. **Medium-urban**: more than 50% of population lives in towns with more than 15 thousand and less than 100 thousand of inhabitants. **Semi-urban**: more than 50% of

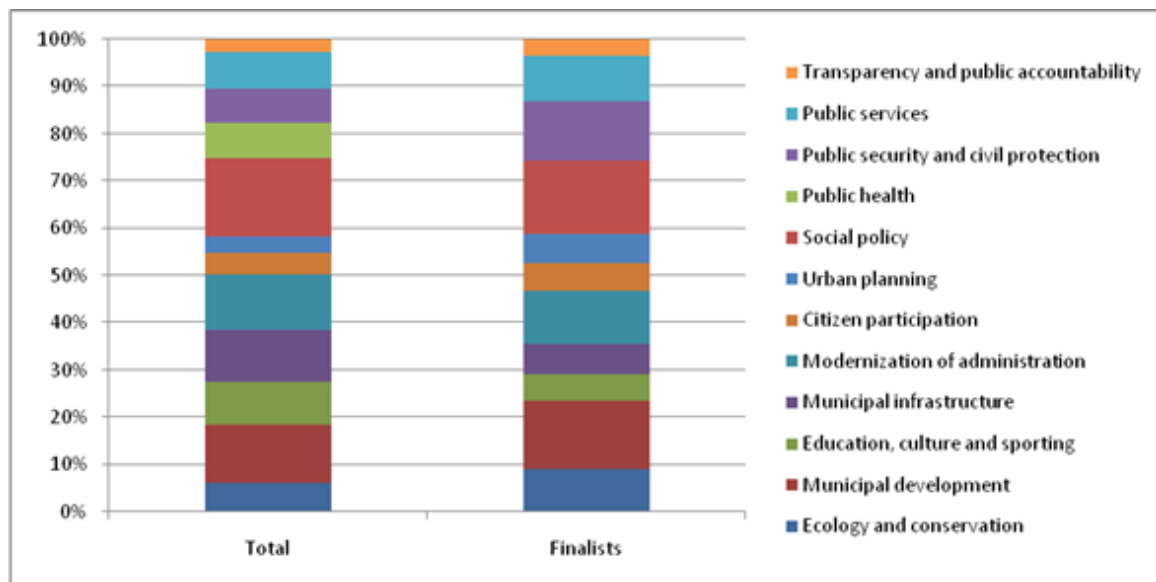
Rural, 2. Semi-urban, 3. Mixed, 4. Medium-urban, 5. Big-urban, and 6. Metropolis. Measures on social exclusion and population will be used as reference to give an idea of differences in capabilities of local administrations. It can be observed different levels of institutional development among Mexican local governments, this presumably linked to the level of economic development and the size and concentration of their respective populations. According to municipalities' size and levels of social development, it can be observed differences in resource availability, civil servants capability and *bureaucratization* of organizations.

After reviewing the innovation panorama provided by initiatives participating in the award, a more detailed analysis will be carried by reviewing finalist initiatives. The second stage of the award contest consists of a pre-selection of initiatives. A specialized commission is in charge of evaluating participant initiatives and selecting some that show greatest potential according to the objective of the award. Selected initiatives will go through an in-depth evaluation at the places they are being implemented and the awarded initiatives will be nominated afterwards (around five initiatives are awarded each year). Finalist initiatives: those that were pre-selected by the specialized commission, they are going to be the base for the next part of the analysis.

For the analysis of finalist initiatives they will only be selected those submitted by municipalities at opposite ends of CONAPO's classification of social exclusion: High and Low. This is under the assumption that municipalities at ends of the classification are better comparable due to sizes of population and government apparatus, given that metropolis and big urban centers (with much bigger budgets and more complex government organization) are found in middle levels of the exclusion classification. The analysis has as purpose to identify relevant features in design and implementation of innovative initiatives, as read in their briefings, and build a characterization of initiatives implemented by low and highly excluded municipalities (different in development of their government institutions). The objective is to compare characterization with the ideas explained before on innovation and institutional development.

4.1 Frequencies and percentages of participant and finalist initiatives of the award

The contest for the Government and Local Management Award is carried every year since 2001. For the present analysis we count on information from initiatives between years 2005 and 2011. Total participant initiatives in that period of time sum up for 2,301 in all award categories, while total finalist initiatives sum up for 175 (a twenty each year, approximately). Initiatives are classified in categories that indicate the field of government action framing their implementation (category is selected by submitting municipalities when filling in submission). However, it can be verified that initiatives generally are not entirely delimited by one single category, due to the extent of application. Therefore, categories are just a guiding reference. Graphic-1 shows the sharing of categories among all participant and finalist initiatives during our period of time.



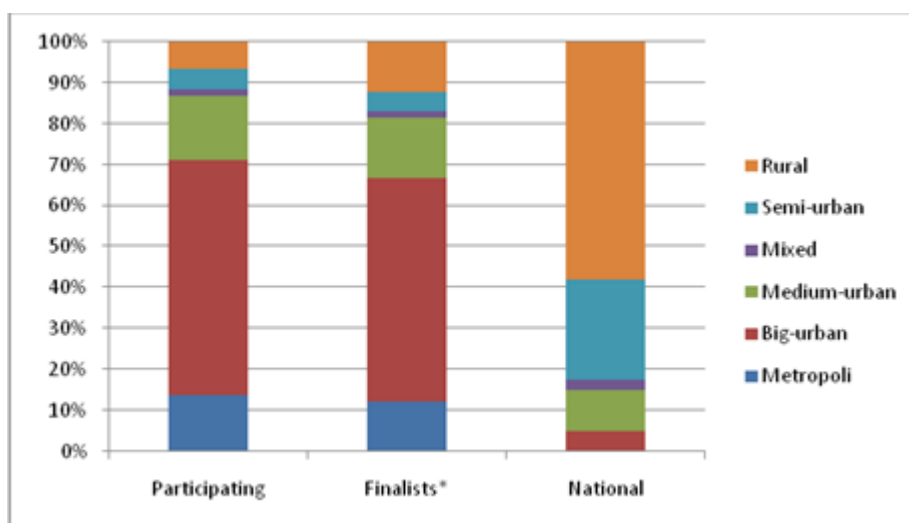
Graphic 1. Share of categories in total participating and finalist initiatives.

Four out of twelve categories gather around half of total participating initiatives: Social policy (16%), Municipal development (12%), Modernization of administration (12%) and Municipal infrastructure (11%). The image turns to be

population lives in towns with more than 2,500 and less than 15 thousand of inhabitants. **Rural:** more than 50% of population lives in towns with less than 2,500 inhabitants. **Mixed:** population is found distributed as in previous categories, but none of them gathers more than 50% of population.

more or less similar when we account only for finalist initiatives: Social policy (15%), Municipal development (14%), Public security (13%) and Modernization of administration (11%).

Graphic-2 shows percentages of all participating and finalist initiatives, by size and concentration of population in submitting municipalities. The column called 'National' does not account for initiatives, but for the total number of municipalities within the country (2.454). It works for comparison purposes, between proportion of submitted initiatives and proportion of country's municipalities. It calls the attention that more than 50% of total initiatives come from municipalities classified as 'Big-Urban'. That is also true for finalist initiatives. At the same time, initiatives from municipalities classified as 'Metropolis' account for 12% and 14% of finalist and total participant initiatives, respectively. This observation is quite remarkable, since Metropolis represent less than 1% of the number of municipalities in the whole country. Likewise, Big-urban represents 4.5% of country's municipalities. Therefore, around 70% of total and finalist initiatives come from Metropolis and Big-urban municipalities, which these roughly represent 5% of the whole number of municipalities in the country. Another remarkable observation is that 'Rural' represents around 60% of municipalities in the country, while initiatives coming from rural municipalities barely account for 7% and 12% of total and finalist initiatives, respectively.



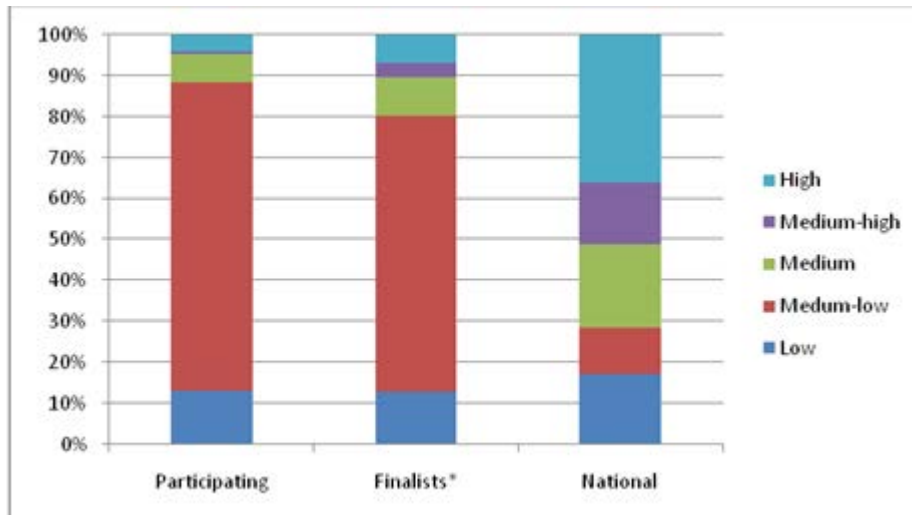
*Three initiatives, simultaneously submitted by multiple municipalities, were left out.

Graphic 2. Percentages of participating and finalist initiatives by types of population.

Same inverse relation can be observed when setting initiatives and municipalities according to levels of social exclusion, as shown in Graphic-3 ('National' column is for comparison purposes, like in previous chart). It can be verified that almost 90% of total participating initiatives come from municipalities with low and medium-low levels of social exclusion, while these kinds of municipalities account for less than a third of total country's municipalities. At the same time, those with high and medium-high levels of exclusion account for 5% and 10% of total participating and finalist initiatives, while same levels of exclusion affect to half of country's municipalities.

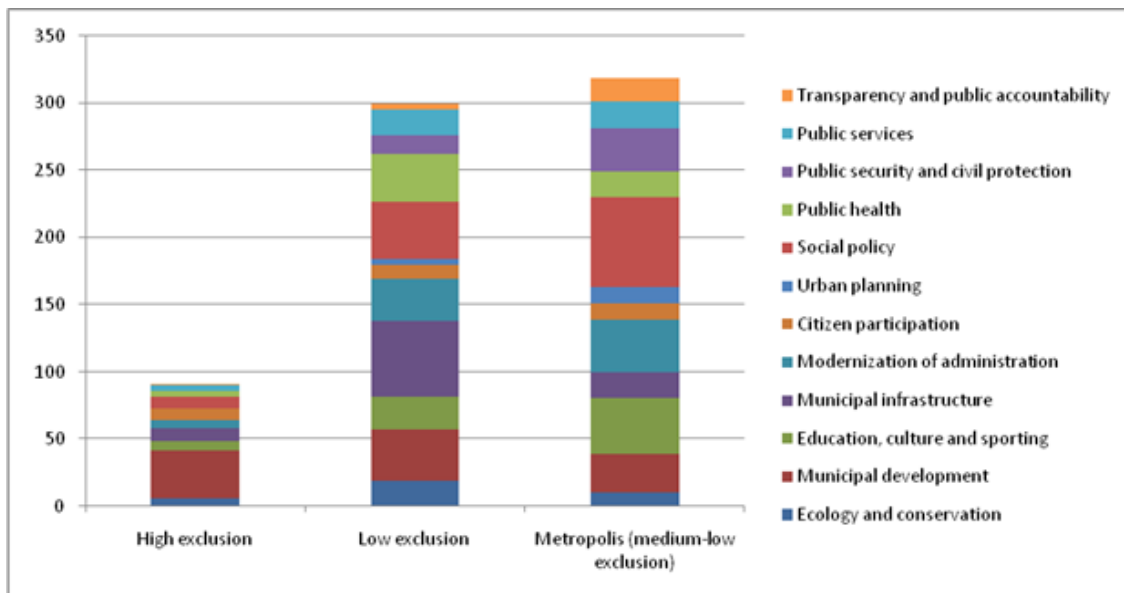
Graphic-4 shows shares of award's categories among all initiatives submitted from municipalities with high and low levels of exclusion. These are compared to the total amount of initiatives submitted by Metropolis. All Metropolis within the country suffer from medium-low levels of social exclusion and account for 0,5% of total country's municipalities. It is remarkable that initiatives submitted by Metropolis surpass initiatives respectively submitted by municipalities with low and high levels of exclusion. Three categories gather around a half of total initiatives from low exclusion municipalities: Municipal infrastructure (19%), Social policy (14%) and Municipal development (13%). Four categories gather around 70% of total initiatives from highly excluded municipalities: Municipal development (40%), Municipal infrastructure (10%), Citizen's participation (10%) and Social policy (10%).

Five categories gather 65% of total initiatives from municipalities classified as Metropolis: Social policy (21%), Education, culture and sports (13%), Modernization of administration (12%), Public security (10%) and Municipal development (9%).



*Three initiatives, simultaneously submitted by multiple municipalities, were left out.

Graphic 3. Percentages of participating and finalist initiatives by level of exclusion.



Graphic 4. Share of categories in initiatives submitted by highly and lowly excluded municipalities and Metropolis.

4.2 Semifinalist initiatives from highly excluded municipalities:

Within the seven year period covering our analysis, 174 initiatives were pre-selected for the final stage of the award contest. From these, 12 initiatives (7%) were submitted by municipalities suffering from high levels of social exclusion. In Table-2 are presented short descriptions of each of these finalist initiatives and their submitting municipalities. Among these, half of municipalities are classified as 'Rural', according to their low size of concentrated population. Rural municipalities suffering from high levels of social exclusion are the most frequent within the country (28% from total number of country's municipalities). As seen before, highly excluded rural municipalities are shortly represented among award's total participating and finalist initiatives.

Table 2. Semifinalist initiatives from highly excluded municipalities.

State	Municipality	Population	Type	Initiative short description	Award category
Oaxaca	Santiago Comaltepec	1386	RU	Child music band. It was created to preserve traditional music and to breed values into child. Instruments were bought thanks to collaboration in funding from other public instances.	Education, culture and sports
Oaxaca	Santiago Yosondúa	7197	RU	New ecological nature park. The project was started by a civil association and sponsored by municipal government. Citizen assemblies and funds from higher government instances took part in the development process.	Municipal development
Jalisco	Cabo Corrientes	9034	RU	New eco-tourism attractions. Implementation of new touring routes and attractions. It includes training for local producers, promoting local tourism and restoring public spaces.	Municipal development
San Luis Potosí	Matlapa	29548	RU	Actions for reducing death in birth labor. Actions are focused in diagnosis, information workshops and legal counseling.	Public health
Michoacán	Chilchota	30299	SU	Education program for indigenous people. It includes building classrooms and new school spaces and buying new materials. State government participates in literacy activities and it was also created a 'municipal commission for education'.	Education, culture and sports
Michoacán	La Huacana	31774	RU	Municipal development strategy. It suggests and implements actions for introducing sustainability in all local government functions.	Municipal development
Michoacán	Huetamo	41239	MU	Program of economic incentives. Gives counseling and financial aid to the main economic activities of the region.	Municipal development
Yucatán	Tizimín	69553	MU	Delivery of basic public infrastructure. Financial resources from a Federal fund were taken to deliver basic public infrastructure to an area with high social exclusion.	Social policy
Chiapas	Cintalapa	73668	MU	Transparent public accountability program. Promotes access to information through a web page and a TV cast and also allows for participation of citizens in planning development and investment programs.	Transparency and public accountability
México	San José del Rincón	79945	RU	Civilian recruitment for policy functions. Neighbors in communities with greatly dispersed population are enrolled to help in policy functions.	Public security and civil protection
Chiapas	Villaflores (1)	93023	MI	Municipal development planning. Design of the plan for development and investment was carried through collective participation of citizens after a hundred of meetings in many areas of the municipality.	Citizen participation
Chiapas	Villaflores (2)	93023	MI	Forest fire prevention program. It is based on improvement of technical and material capabilities and participation of citizens and civil organizations.	Ecology and conservation

RU = Rural, SU = Semi-urban, MI = Mixed, MU = Medium-urban

Finalist initiatives from Matlapa, Chilchota, and San Jose del Rincon are good examples of implementations addressed to improve citizen's life conditions along with basic public service provision, not by its technical design nor by strategic investment, but by creative new ways to deal with resource scarcity and lack of *institutionalism*.

Remarkable are cases based on extensive citizen participation for designing and implementing policies and programs. Initiatives from Santiago Yosondua, Cintalapa and Villaflores (2) put in practice participation at early stages of implementation or as an instrument for an accountable application of core initiative actions. Meanwhile, the initiative from Villaflores (1) stands out from its vast implementation of participation strategies. Only the initiative from Villaflores (2) mentions collaboration of no-state entities.

Initiatives rarely mention considerable investments or great use of technical and financial resources in implementation. Nonetheless, in few cases where considerable investments are needed they are provided by funds from higher levels of governance.

Santiago Comaltepec, Santiago Yosondúa and Cabo Corrientes are the smallest municipalities submitting a finalist initiative; their population size makes them to be classified as 'Rural'. Thus, their initiatives appear to be simple idea applications with little bureaucratic complexity (with significant positive effects, nonetheless). Here, social capital seems to be more relevant than govern institutionalism in idea generation and implementation.

Bureaucratic appeal is more evident in initiatives from bigger municipalities, with greater size and population concentration, such as the ones from Chilchota, La Huacana, Huetamo, Tizimin, Cintalapa and Villaflores (2).

No initiative seems to be addressed to improve efficiency in public administration. In turn, it seems that initiatives are addressed to strengthen links between public instances and citizens and to develop local government as institution; that is: increasing effectiveness in delivering to citizens' needs and a transparent management of public resources.

There is one particular case where highly excluded municipalities take part in an association with municipalities with low levels of exclusion; it will be described in the next section.

Highlights of finalist initiatives from municipalities with high levels of exclusion can be summarized as follows: i) Improvisation and ad-hoc strategies, ii) Citizen participation is a highlighting feature, iii) Investment and use of technical resources are low: social capital seems to be more relevant, iv) Initiatives acquire a more bureaucratic appeal as they grow in population, v) Goals for administrative efficiency seem to be absent in finalist initiatives, vi) Associating with other municipalities for service delivering, vii) Initiatives addressed to meet citizens' needs and to a more transparent use of public resources.

Semifinalist initiatives of municipalities with low exclusion:

Among 174 initiatives pre-selected for the final stage of the award contest 24 (14%) were submitted by municipalities with low levels of social exclusion. In Table-3 are presented short descriptions of each of these finalist initiatives and their submitting municipalities. In average, municipalities in here are bigger than highly excluded municipalities submitting finalist initiatives. However, the size gap is not as big as could be observed with respect of municipalities with medium-low and medium levels of social exclusion. Nonetheless, it calls the attention that medians of municipalities' population in Table-2 and Table-3 are very close.

Table 3. Semifinalist initiatives from municipalities with low exclusion.

State	Municipality	Population	Type	Initiative short description	Award category
Oaxaca	Capulálpam de Méndez	1313	RU	Municipal development program. Design of the program is based in high citizen participation, not just in planning of actions but also in its implementation.	Municipal development
Jalisco	El Limón	5410	SU	Inter-municipal actions for restoring Ayuquila river. A trusteeship and a technical commission were created. For carrying the job, complementary financing was obtained and citizens' participation was enabled.	Ecology and conservation
Tlaxcala	Ixtenco	6279	SU	Citizen council for public account supervision. Creation of a citizen council with the objective to keep surveillance over municipal public accountancies.	Citizen participation
México	Tonatico	10901	SU	Keeping links with emigrated people. Actions addressed to help emigrated people to stay linked to their community. Some other public organizations took part.	Municipal development
Tlaxcala	Panotla	22368	SU	Recondition public spaces for sport practice. Financial resources from the three levels of governance were taken to enable spaces to be used for sport practicing.	Municipal infrastructure
Jalisco	Ixtlahuacán de los Membrillos	23420	RU	Increasing revenues in real property taxes. A program of incentives for tax payers was implemented. It helped to overcome a situation where tax revenues were inferior to costs of collecting property taxes.	Modernization of administration
Guanajuato	Jaral del Progreso (1)	31780	MU	Scholarships program. Sponsoring education through scholarships.	Education, culture and sports
Guanajuato	Jaral del Progreso (2)	31780	MU	Citizen access. Opening access to citizenry by enabling special modules for attention and giving information on municipality's tasks.	

State	Municipality	Population	Type	Initiative short description	Award category
Jalisco	Tuxpan	32462	MU	Inter-municipal development plan. Design of the plan was coordinated between municipalities. It included participation of local producers and civil organizations. Links to universities and technology transfer is a remarkable part of the plan.	Municipal development
Jalisco	Tamazula de Gordiano	35987	MI	Broadcasting council sessions. A TV channel was created for broadcasting sessions of the municipal council.	Municipal development
Guerrero	Pungarabato	36466	MU	Inter-municipal actions for development. Include various actions framed by a whole development program: urban waste management, delivering basic services, sponsoring entrepreneurial projects.	Municipal development
Zacatecas	Ojocaliente	37545	MU	Hepatitis prevention program. Program includes latrines installation, information rounds and medical analysis and diagnosis.	Public health
Coahuila de Zaragoza	Parras	44715	MU	Enabling delegations to help communication between scattered communities and municipality head.	Modernization of administration
Jalisco	Zapotlanejo (1)	55827	MU	Urban development program. Building and restoring urban facilities. It includes participation of the three levels of governance and also private organizations and universities.	Urban planning
Jalisco	Zapotlanejo (2)	55827	MU	Integral health program. It includes itinerant health services, prevention campaigns, building and restoring clinics and sponsoring eye surgeries.	Public health
Veracruz	Coatepec	79787	MU	Forest and water conservation. Creation of a trusteeship for forest and water conservation purposes.	Ecology and conservation
Guerrero	Iguala de la Independencia	128444	UG	Inter-municipal urban waste management. It emerged in the context of an already existent association of municipalities. Being in an association has allowed obtaining funds from higher levels of governance.	Municipal infrastructure
Hidalgo	Tulancingo de Bravo	129935	MU	Paths for no-motor mobility. Setting of paths to help mobility among communities by means of no-motor vehicles.	Municipal infrastructure
Sonora	Navojoa	144598	BU	Actions for restoring the Mayo river. Implementing actions to solve river deterioration	Ecology and conservation
Veracruz	Córdoba	186623	BU	Restoring the urban area known as "Alameda Murillo Vidal"	Municipal infrastructure
Quintana Roo	Othón P. Blanco	219763	BU	Construction of community area. Financial resources from a Federal fund were taken to build and recondition a community urban area.	Urban planning
Puebla	Tehuacán	260923	BU	New 'Intra-family violence attention center'. Creation of a center for aiding and counseling people that suffers from family violence.	Social policy
Michoacán	Uruapan	279229	BU	New 'Council for municipal development'. A council was created with people representing territories of the municipality. Its purpose is to join citizen participation into planning of infrastructure building.	Municipal infrastructure
Guerrero	Acapulco de Juárez	717766	BU	Childs' municipal council. New council that meets regularly for ruling on childhood issues.	Citizen participation

RU = Rural, SU = Semi-urban, MI = Mixed, MU = Medium-urban, BU = Big-urban

Implementation of initiatives from municipalities with low exclusion looks more complex in management and proceedings (they have a more *bureaucratic* appeal). This is more or less observable among all initiatives, but

especially evident in initiatives such as the ones from El Limon, Ixtlahuacan de los Membrillos, Tuxpan, Pungarabato and Tehuacan.

Initiatives demanding citizens' participation are also common here. Initiatives from Ixtenco, Uruapan and Acapulco de Juarez incorporate participation into the formal organization of the local government. Collaboration of no-state entities is rare. They are mentioned taking part in initiatives from Tuxpan and Zapotlanejo (1).

The use of technical and financial resources is more evident in finalist initiatives from municipalities with low exclusion, like those from El Limon, Panotla, Jaral del Progreso (1), Tuxpan, Ojocaliente and Navojoa. Also, from initiatives that go through widening public infrastructure, one could deduce public expense is bigger in initiatives from lowly excluded municipalities. Initiatives from Panotla, Zapotlanejo (1), Cordoba and Othon P. Blanco are good examples of it.

Initiatives based in unions of municipalities are frequent. Some of these are made up for services provision, particularly urban waste management. Award's contesting allows municipalities to submit initiatives that are implemented together with other municipalities, as did by El Limon, Tuxpan, Pungarabato and Iguala de la Independencia. However, municipalities associated in the implementation of an initiative are allowed to submit and contest simultaneously. There are two finalist initiatives with significant presence of municipalities with low exclusion (see Table-4). Noticeably, in one of them appear highly excluded municipalities taking part.

Overall, initiatives seem addressed to strengthen local government institution (through promoting transparency and participation) and to improve citizens' living quality. Initiatives addressed to improve efficiency or promote modernization of public instances are not specially highlighted. Certainly, one could think of municipalities associating for service delivering (waste management, in particular) as driven by management efficiency. Nevertheless, the initiative from Ixtlahuacan de los Membrillos is the only one that features the spirit of an efficient public administration (as it is subscribed to the 'Modernization of administration' category). This one of a kind among all finalist initiatives from low and highly excluded municipalities.

Table 4. Semifinalist initiatives from jointly municipalities' submissions.

State	Municipalities	Exclusion	Type	Initiative	Category
Jalisco	Concepción de Buenos Aires, Santa María del Oro, La Manzanilla de la Paz, Mazamitla, Quitupan, Tizapan el Alto, Tuxcueca, Valle de Juárez	L, H, L, L, H, L, L, L	SU, RU, RU, SU, RU, SU, SU, SU	Inter-municipal urban waste management	Public services
Mexico	Amecameca, Atlautla, Ayapango, Cocotitlán, Chalco, Ecatingo, Ixtapaluca, Juchitepec, Ozumba, Temamatla, Tenango del Aire, Tepetlixpa, Tlalmanalco, Valle ChalcoSolidadidad	L, L, L, ML, L, M, ML, L, L, L, L, L, ML, ML	MU, SU, RU, SU, BU, SU, BU, SU, MU, SU, SU, SU, MI, BU	Municipal association for development	Municipal development

L = Low, ML = Medium-low, M = Medium, H = High,
RU = Rural, SU = Semi-urban, MI = Mixed, MU = Medium-urban; BU = Big-urban

Highlights of finalist initiatives from municipalities with low levels of exclusion can be summarized as follows: i) Initiatives look more complex in management and proceedings (they have a more bureaucratic appeal), ii) Citizens' participation is incorporated into formal government organization, iii) Investment and use of technical resources are higher than in highly excluded municipalities' initiatives, iv) Unions of municipalities are frequent, v) Initiatives are mostly addressed to enhance effectiveness in meeting citizens' needs and to pursue legitimation; however, efficiency goals are also featured, to a lesser extent.

4.3 Discussion

Statistics show very low participation rates of initiatives from highly excluded rural municipalities. On the other hand, initiatives from big urban centers – typically with medium-low or low levels of exclusion – they show an extensive participation. This is opposed to the proportion that these kinds of municipalities represent among the total number of municipalities within the country. Suitable reasons for this to be the case might come from bias in award's promotion of participation, lack of municipalities' interest for taking part in the contest (together with lack of awareness), or that this actually is an indicator of capabilities and un-capabilities of Mexican local governments. Borins (2001, 2006) makes his analysis basing on information from the Innovations in American Government Awards¹⁶⁷: a contest with a format very similar to that of the Government and Local Management Award. Borins (2008, p. 4) says about information from the American Government Award: "Because the awards program casts its net so widely and generates so much interest, we can be confident that its pool of applicants represents the range of trends in innovation in government". Having Borins argument as reference, if we assume that what can be read from the Local Management Award is a true image of local governments at national level, one could then interpret the small participation rates of highly excluded rural

¹⁶⁷ <http://www.ash.harvard.edu/Home/Programs/Innovations-in-Government/Awards>

municipalities as evidence of their low capacity for generating novel and significant government actions, while large participation rates of big urban centers might on the contrary be evidencing a larger capacity.

When grouping initiatives by characteristics of submitting municipalities, it can be observed different tendencies in award's categories where initiatives are subscribed. Social policy and Municipal development are among most frequent categories. This point to the importance of local government actions addressed to give attention to vulnerable population and to supplement backwardness of citizens' life conditions. On the other hand, categories more related with local government institutional appeal, such as Transparency and public accountability and Urban planning, they are less frequent.

It is remarkable that more than a third of initiatives from highly excluded municipalities are in the Municipal development category. In turn, the most frequent category among initiatives from municipalities with low exclusion is Municipal infrastructure, while initiatives from metropolis give some importance to categories that are less relevant among other kinds of municipalities, such as Education, culture and sporting and Modernization of administration. This gives support to believe that municipalities with low social exclusion (presumably, more institutionally developed) and metropolis (with larger financial capacity and more complex organizations) they have partially overcome the pre-bureaucratic stage that hinders the application of novel, sustainable and significant governance initiatives.

In general terms, initiatives encompass to a certain degree the previously described settings of Mexican local governments counteracting efficient-effective administrations' performance. To this respect, the 2011 executive report of the award remarks: *Our municipalities tend to high rotation in civil servants' positions, to give little or no continuity to the work of previous administrations and to start every new governance period with new personnel and new organization models... The challenge of our local governments is to lead to good results in short time and with scarce resources.* This is embedded in reviewed initiatives, where sidestepping and ad-hoc design are still noticeable. However, those initiatives submitted by municipalities with low levels of social exclusion appeal governmental organizations with greater institutional strength: perhaps a consequence from greater social development. Initiatives that formally incorporate citizens' participation into government organization, higher levels of expense and use of technical resources and certain efficiency pursuing features give evidenced in that direction.

In municipalities with high levels of exclusion weakness of the local governance institution (in what is been called *the pre-bureaucratic stage*) is more tangible. However, the profile of their finalist initiatives show some interesting characteristics that suggest innovative initiatives can be a way to enhance local government capability and, in the long run, allow for sustainable improvement through innovation. High levels of citizens' participation, use of social capital, aim for development and association with municipalities with better capabilities give evidence in that direction.

Initiatives from municipalities with low and high levels of exclusion have in common the aim for pursuing actions whose results lead to develop life conditions and government legitimacy, while actions towards a more efficient administration are rare in municipalities with low exclusion and inexistent in highly excluded municipalities. Here we might have additional evidence on the dichotomy between efficiency and legitimation. As it can be seen, legitimation is much more appealed in reviewed initiatives, which lead to believe that strengthening local government institution is still much needed among Mexican municipalities and it is still a fundamental objective. It is a requirement for a more efficient public administration, which allows for sustainable higher leveled innovation.

5 Concluding remarks

Organizations responsible for public administration in developing countries suffer from lack of legitimacy and institutional weakness. In the particular case of Mexican local government, where lack is more tangible than in higher levels of governance, institutional weakness lead to public administrations performing in discretionary ways. Lacks in regulation, continuation and systematization of activities lead to innovation as a policy strategy: innovation is a consequence of a groping and sidestepping management style. Thus, in most part, innovation in Mexican local governments does not appear as a virtuous process that brings improvement and technical enhancement, but as a process that encompasses inefficiency, backwardness and under use of public resources in its way to achieve some results.

An innovative implementation needs an institutional frame that allow for its systematization and continuity (i.e. solid institutions and strong regulations). Thus, for innovation to be successful in improvement it is necessary that public organizations previously went through a process in a way somewhat opposed to that of innovation: strengthening hierarchies and authority, processes and regulations, in such a way that they let for well-defined and established operations that can go over organizational changes due to changes in administration after elections (and such that it helps to moderate the dynamics of change). Hence, the paradigm of efficiency and improvement found in innovation require overcoming the *pre-bureaucratic* stage of public institutions, where excessive flexibility and lack of regulation make "innovation" the usual mean to operate. This situation leads to inefficient results and scarce chances to develop improvements. However, in so called pre-bureaucratic institutions innovation can be of special value and lead to sustainable efficiency and development when it is addressed to institutional strengthening. That is to say, when creative initiatives and search for alternative ways generate sustainable processes and help to more solid institutions.

Observation of initiatives taking part in the Government and Local Management Award gives evidence to believe that Mexican municipalities with low levels of social exclusion (presumably with higher institutional development) have more appropriate institutional characteristics for successfully implementing innovation as a tool for public service

improvement. And, on the contrary, poorly developed Mexican municipalities find more difficulties to achieve improvement and development through innovation. Observation of initiatives also yields an important conclusion: Innovation can be of special benefit for poorly developed municipalities when it is addressed to strengthen the institutional founding of local governments.

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Co-designing Employee-driven Service Development Instruments for Public Health Care

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The paper presents an action research on co-designing employee-driven service development instruments for public health care professionals. The empirical study examines how the methods and tools co-designed for service development with the workers could support employee-driven innovation initiatives in health care organizations, and strengthen the approach and emphasis on the discovery of unmet human needs in service development. Particularly, the research findings focus on how the co-designed instruments overcome the identified barriers for engaging health care professionals in employee-driven innovation processes.

1 Introduction

Academic articles and mass media remind us frequently that health care is in crisis and that public health care is becoming too expensive (Kaplan; Porter, 2011). At the same time, the quality of health care should remain high with well-designed processes, committed patients and satisfied employees. To solve the crisis, public health care needs actions at both policy and grass-root levels. Part of the solution may be that employees take more initiative in developing more efficient processes and services.

Over the recent years, we have witnessed a hike of interest in employee-driven innovation (Kesting; Ulhøi, 2010). Some of this attention has even focused on health care context (Knol; Van Linge, 2009; Tsai; Liou; Hsiao; Cheng, 2013; Åmo, 2006). Yet, we still lack understanding on how to engage public health care professionals to design services and to renew everyday work practices. Based on our experience in the field, there are typically some individuals who are interested in planning the processes but it is challenging to have larger scale participation in development activities in public health care organizations.

Encouraging employee-driven innovation in public health care requires not only theory development in the field but practical solutions that are helpful for employees in renewing work practices. Our research is based on the research group's interest to combine entrepreneurial behaviour and innovation with design thinking to create new, flexible and rapid service development instruments in public health care.

Particularly, we are interested in how to take the contextual restrictions of public health care organizations into account in developing practical tools and methods for everyday innovation activity. In this paper, we present two service development instruments that were co-designed with health care professionals to enhance employee-driven innovations in public health care. They showcase instruments that overcome the constraints characteristic to the context. The co-designed instruments, the collective service development tool "Idea Window" and the customer participatory tool "Travelling With Change", were created as a part of the service design oriented joint development in the project.

We focus in our research paper on the discovery of new employee-driven service design instruments in everyday work for tackling the unknown – customer needs, user understanding, tacit knowledge in work, hidden possibilities and initiatives in work context – to be identified and clarified in service design, development and innovation processes. The study examines in particular how the methods and tools co-designed for service development with the workers could support employee-driven innovation initiatives in health care organizations, and strengthen the approach and emphasis on the discovery of unmet human needs in service development.

The paper is organized as follows. First, we briefly introduce available literature on employee-driven innovations with a specific focus on the context of health care organizations. Second, we describe the methods for co-designing the employee-driven service development instruments, and the methods employed for data collection and analysis. Third, we discuss our research findings. We focus on the factors that encourage employees to participate in the design and use of service development instruments. Thus, we contribute to the literature by identifying employee rationale on how to engage health care professionals in employee-driven innovation processes.

2 Employee-driven innovations

Innovation is a multidimensional process that covers various aspects of newness. It may refer to the development process with an outcome of new goods, services, marketing methods, or even organizational practices. Here, we do not approach innovations as commercial success stories. Instead, we refer to process innovations that are new ways of acting to diminish the cost or to increase the quality of health care services. This includes but is not limited to organizational innovations that are changes in the workplace practices to improve administrative efficiency.

Innovations may origin from 1) actors and other sources external to the organization, or 2) the internal actors, such as R&D staff and other employees (Cassiman; Veugelers, 2006). In this paper, we focus on the latter source of innovations. To be precise, we are interested in employee-driven innovations (EDI).

EDI refers to the exploration and exploitation of new processes and work practices that originate from a single employee or a group of employees to whom innovation development is not a part of job description (Kesting; Uhløi, 2010). In EDI literature, it is considered that ideas how to improve processes and work practices stem from ordinary employees. In other words, internal innovation development is not only for the designated R&D people. In fact, research findings support EDI, as evidence shows that it is beneficial to engage ordinary employees in service development processes. However, it is also outlined that ungoverned participation is counterproductive. (Kesting; Uhløi, 2010.)

Engagement of health care professionals in innovation processes has also been requested by both public health care organizations as well as professionals. Research findings by Oecon (2006) indicate that health care professionals do not perceive to have equal opportunities to participate in innovation processes. Particularly, staff in the lower ranks perceives that it is not suitable to enact innovative role at the workplace.

Therefore, there is a need to empower the staff to engage in innovative activities. In addition to structural empowerment which refers to power based on the employee's position in the organization, there needs to be psychological empowerment for the staff in the lower ranks (Knol; Van Linge, 2009). Psychological empowerment refers to the fundamental personal convictions that employees have about their role in the organization. As Tsai et al. (2013) have found, worksite support can support psychological empowerment. This support takes into account open communication systems which empowers employees and engages them in decision-making and EDI processes (Fees; Taherizadeh, 2012). Thus, management of health care organizations can create a supportive worksite where creative nurses are more likely to work and get engaged in development (Tsai et al., 2013). These findings are in line with the study by Wihlman; Hoppe; Wihlman; Sandmark, 2014) in the context of Swedish welfare services. Their research identified three main themes to support EDI, namely support (including leadership and innovation processes), development (including creativity and learning), and organizational culture (including attitudes and communication). In addition, it has been proposed that employees require incentives for engaging in EDI (Kesting; Uhløi, 2010). This proposition is supported by evidence on rewards systems boosting creative activities in commercial organizations (Gupta; Singhal, 1993). In brief, public health care organizations need to create the right conditions to improve empowerment of health care professionals.

However, the creation of beneficial conditions is not always easy, as there are barriers for engaging in service development activities in health care organizations. For instance, Wihlman et al. (2014) have found that unclear or non-existing innovation processes with ambiguous goals, insufficient learning, and deficient organizational slack, attitudes of colleagues and lack of communication hinder the likelihood of innovation activities in welfare services.

To synthesize, the research indicates that EDI requires instruments that help in structuring the service development process. The practical tools and methods need to provide psychological empowerment and incentives to those in lower ranks in the health care organization. In addition, the instruments must encourage positive support to development activities and enhance open communication. These insights were taken into account in the action research project that focused on co-designing employee-driven service development instruments for health care professionals. We present the action research and the results in the following chapters.

3 Empirical study

In the action research project we co-designed two employee-driven service development instruments. Our aim was to create instruments which would help in overcoming the typical constraints in EDI in health care context.

3.1 Action research

The empirical study is based on a multidisciplinary action research project realized in two large public sector health care organisations in Finland. Two project case studies were realized in the Pirkanmaa Hospital District and in the Central Finland Health Care District. During the project, the project team co-operated with the health care professionals for creating new tools and methods for developing services in the context of everyday work practice. The co-operation was based on service design methodology and design thinking which were partly known and applied in co-operating organisations.

Co-designing service development instruments and test-using them with employees is a good approach to engage working community gradually and pragmatically in design thinking. Design thinking taps into capacities we all have but that are overlooked by more conventional problem-solving; it focuses on creating products and services in process which is deeply human (Brown; Wyatt, 2007). Design thinking relies on our abilities to be intuitive, to recognize patterns, to construct ideas that have emotional meaning as well as being functional (ibid.).

The designers in the project were facilitators helping the employees in the co-operating organisations to meet a need for service development but also to communicate and to "externalise ideas in a way that others (especially non-designers) can understand and so enable discourse and debate" (Koskinen; Zimmerman; Binder; Redstrom; Wensween, 2011, 125). The instruments were eventually created by group working which is a fundamental part of the service designer's function in any organisation given the multidisciplinary nature of the field (Callaghan 2009). The dialogue was facilitated through the creation and discussions initiated from ideation and use of instruments.

Instruments developed in the project were utilized as situated design methods to support employees' ability to better understand processes and to identify opportunities for learning, developing and renewal in different situations in one's own work and work community and this way to enhance change (Simonsen; Bærenhold; Büscher; Scheuer, 2010). The aim is hence, as Schön (1983, 68) describes it, that "The practitioner allows himself to experience surprise, puzzlement, or confusion in a situation which he finds uncertain or unique. He reflects on the phenomenon before him, and on the prior understandings which have been implicit in his behaviour. He carries out an experiment which serves to generate both a new understanding of the phenomenon and a change in the situation".

The two cases shared the context of public health care. However, they were different in terms of aim and approach of the co-designing process. In the first case (Pirkanmaa Hospital District) employees co-designed service by collectively observing customers without engaging customers in the actual design process. In the second case (Central Finland Health Care District), the instrument was designed for the employees but the actual content was mostly generated in the intensive collaboration with the customers. This enabled stronger focus on the customer viewpoint, whereas in the first case the focus was more on developing processes from the perspective of own tasks as well as customer benefits. These case studies are described in detail in the following.

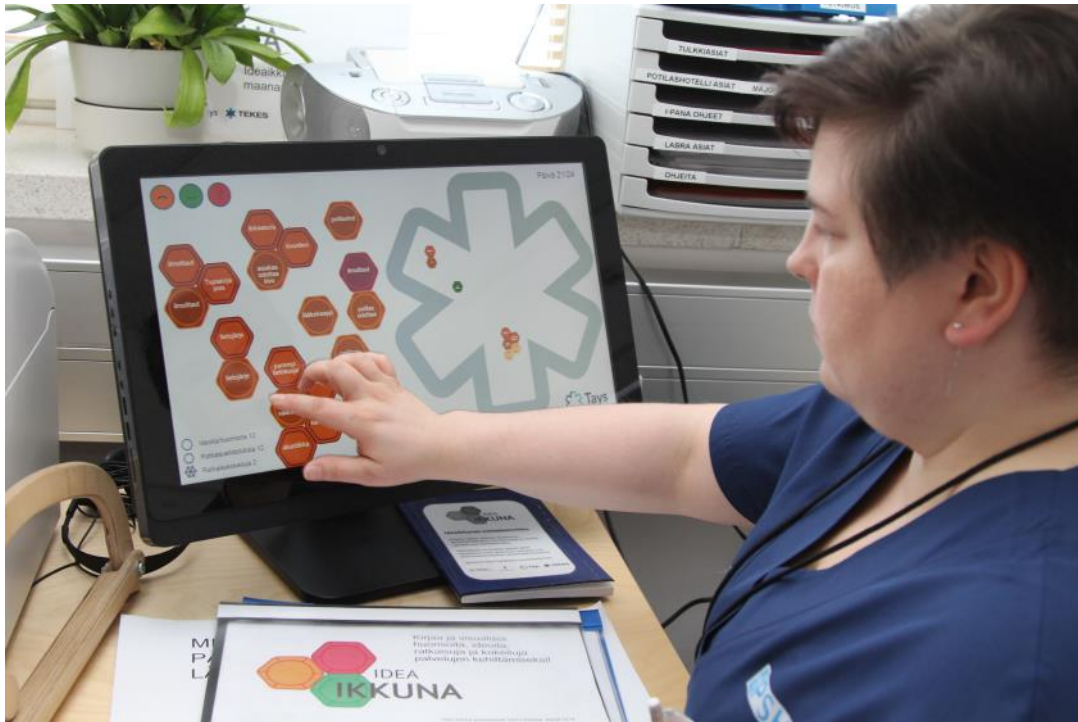
3.1.1 Case Study of the Tampere University Hospital; Pirkanmaa Hospital District, Tampere Finland

In the Tampere University Hospital action research project was realized in close co-operation with the Department of Customer Services and its Customer Service Development Manager. The manager has successfully applied service design many years in different clinics in the hospital. The result of her team's work is encouraging and a good starting point for the project. The department operates with dozens of active and heterogeneous cases. A great number of health care professionals has been time-consuming but has also generated plenty of content for further development activities. The good work has caused a positive problem for the development team; service design is evidently useful and effective method to develop services but application of service design on a larger scale in the hospital requires new ways, tools and methods to inspire and engage personnel to participate in service development. Therefore, new tools and methods would be one way to apply service design in a variety of services and service development challenges, and to get health care professionals involved in development of new service solutions and in dissemination of the best practices and experiments.

The project design team analysed the situation with the development manager and had together an idea of a participatory service development tool that could be co-designed and prototyped with the group of employees in a brief experiment in spring 2014. The processes had been initiated in the case organizations before the designers stepped in. Therefore, the basis for the implementation of the service design tool had already been built. Anyway, in busy environments such as hospitals, it is difficult to get people to break away from the everyday work and to engage in a variety of development challenges, so one of the key features of the tool would be that it helps to see the work in everyday life from the perspective of the service development, and to realize the things that can be solved quickly and nimbly in normal work. Thus, the tool should function in daily work and strengthen employees' sense of initiative and activity. It also should help employees to detect the invisible side of the work, which affects the every day services and the quality of them. It should help in facilitating employees to observe and to record their experiences and ideas relating to services, and to pay attention to the customer's service experience and behaviour. Tackling the unknown – customer needs, user understanding, tacit knowledge in work, hidden possibilities and initiatives in work context would be identified more systematically by the tool. The data collected by the tool would be analysed and clarified together in workshops and used for customer service development.

Idea Window

Idea of employee-driven service development tool was matured in collaboration into a tool called *Idea Window*. The first version of the Idea Window was co-designed in close co-operation with the group of personnel of three clinics in the hospital. The Idea Window was designed to be easy-to-use touch screen computer with simple user functions on the graphical user interface which would be easy to find and available all the time. It was designed as a platform for workers' findings, initiatives, ideas and solution proposals to develop services. In the Idea Window, employees can enter their observations and ideas on the screen. In addition, an employee can propose solutions and experiments related to the findings and observations of the service experience. All the items can be combined together to form a variety of topic clusters on the screen. Employees can modify and store the clusters in the user interface according to what is meaningful to them. Any employee can anonymously leave a proposal in the Idea Window and read and move the items on the screen. The Idea Window was designed to put the patient at the service path clearly visible and to open the view into the customer's service experience. The material produced by the personnel was ground for joint development workshops and utilizable material in service design. In each clinic, two touch screen computers were located in central locations. The Idea Window was used for three weeks in each three clinics that participated in the project.



*Figure 1. The Idea Window in use in the Tampere University Hospital.
Photo by Minna Tuominen, Pirkanmaa Hospital District, 2014.*

During the Idea Window experiment, the personnel produced 75 ideas and comments related to patients' service experiences, 38 proposals for solutions and improving services and 4 proposals for experimentations. The material produced within Idea Window was analysed in two workshops with the group of personnel. Nurses, doctors and couple of members of the hospital administration found the data really revealing and were motivated to use Idea Window during longer time and for different purposes. The customer service unit and the administration representatives evaluated the Idea Window useful on a larger scale if some small changes were made to the interface. The nurses evaluated the Idea Window suiting well to everyday context. It was really important to them that ideation and customer experience observing tools are available all the time and thus are maintaining the customer focus in the service.

3.1.2 Case Study of the Unit of General Practice, Central Finland Health Care District, Jyväskylä Finland

The second research case was actualized in co-operation with the Central Finland Health Care District and more specifically with the Unit of General Practice. The unit had developed a group-based approach to support and guide people who have problems and changes in their health. The service model of the Lifestyle Change Groups (LSC-groups) was developed by the small group of health care professionals in the Central Finland Health Care District as a solution for a need to provide health guidance and support in more collective and interactive ways. The LSC-group activities are organised together by the health care district and the primary care. Also, health care professionals in other parts of Finland have been interested in organizing similar kinds of group meeting activities for customers in health care.

The project team met the LSC-group developers in joint planning workshops in the spring 2013 and together they made a preliminary plan for a series of experiments that could bring some new elements in developing group mentoring. Through participatory workshops and idea sessions the group leaders and developers wanted to form more comprehensive understanding of their customers' needs and life situations to design more interactive service. The service providers (i.e. the group developers and supervisors) had a shared view that good results of the service were due to the trust and transparency clearly apparent in group meetings but never been a specific point in development of the service. Inspired by the review of service design by the research the group organisers wanted to apply service design methods for gathering more information on the members of the LSC-groups and to process the information more consciously with the participants.

Travelling With Change

During the research project the LSC-group developers and leaders designed a printed material package called Travelling With Change. The first plan of the material was to make a guide or a book for LSC-group members, which, however, turned in co-design process into a collection of cards and posters that could function as a dialogic and interpretive situation mapping tool between LSC-group members and supervisors. The collection of the material was designed to be

modular and thus versatile to use in the group meetings and outside of them. The project team was actively involved in material planning and implementation.

The Travelling With Change material contains a variety of tasks and ideas for supporting the group members processing and reflecting their life with the change they have faced. The theoretical framework of the intervention was developed using elements of several theories in health promotion. One is Transtheoretical model, which begins with identifying group members' readiness for lifestyle change. The model also incorporated Social-cognitive theory, Self-regulation theories and motivational interviewing. In the intervention, these theories guide the concrete tasks in customer encounters. (Abraham; Michie, 2008; Prochaska; Redding; Evers, 1997; Prochaska; Velicer, 1997; Michie et al., 2009.) The content does not actually give instructions, but rather evokes group members to think about their individual life and wellbeing from more holistic perspective. The first version of the modular material was a poster with the view of sea in which the user can draw and write down thoughts and experiences related to tasks on the poster (Fig. 2). That version turned out to be effective particularly in opening discussion in meetings and enabling collective review on group members' different life situations and styles. It directed the service development focus on customer's value creation.

The layout and the content of the poster were changed after the first two months experiment. The later version of the material was designed to be a collection of cards and posters, so that it could be used more flexibly and selectively. The posters were still intended to use in joint discussions in the groups. The cards visually matched with the posters (Fig. 3) were clearer and more concise in content.

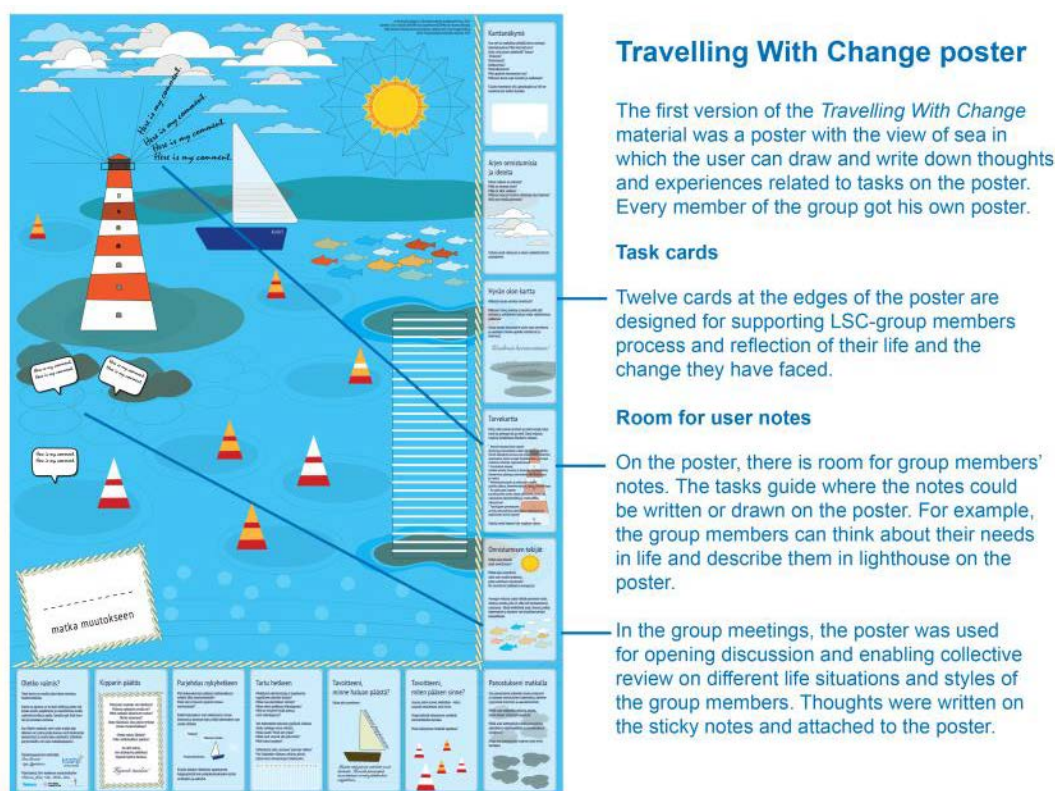


Figure 2. The poster was actively used in the beginning of the meeting for starting the discussion and for gathering customer information.



Figure 3. The new format of the Travelling With Change material was the result of a multi-stage design and experiment.

During the case study of the LSC-groups, 10 workshops were organised. Seven workshops were for health care professionals working as developers or supervisors of the groups, 3 workshops were directed to users. Co-design process with research team members was documented in written memos and partially in video format. The user targeted material package was changed twice during the project. Format changed on the basis of two user participatory test periods. The last version of the Travelling With Change package including cards and posters has received very positive feedback from the group supervisors who have not been involved in the design process. The material is considered as a tool to better align service to different user needs and situations. The form of the package is modular and thus suited for use in both in the group meetings and in privacy.

3.2 Data collection and analysis

Our study builds on field notes and video material from the co-design workshops as well as interviews with healthcare professionals in the participating organisations. Further, written reflections of employees' experiences about the developing are utilized as research material.

Data collected at the Tampere University Hospital consists of interviews with healthcare professionals. At this case organization, attendees were also asked, both in the beginning and in the end of the project, to literally reflect their experiences about the project and the tools used, and to generally describe their thoughts about developing and creating new ideas in their work community. The analysis of video material and field notes collected at the Unit of General Practice in the Central Finland Health Care District is also described for the purpose of this paper.

The data collected at the Tampere University Hospital was analysed by identifying themes that respondents brought up when describing their views and experiences about the development project. All the material was transcribed, read and coded carefully according to emerging topics. After this, the topics were categorized under different themes. In the analysis attention was paid especially on how health care workers experience the type of co-developing used in the project, and what are the preconditions required to support motivation towards EDI.

In the analysis of video material and field notes collected at the workshops organized at the Unit of General Practice in the Central Finland Health Care District the focus was on identifying central themes that were brought up in the co-ideation process when developing the Travelling with Change material package. Here attention was paid on the process of co-designing.

Based on the data and analysis of both cases we identified central experienced benefits of employee-driven service development instruments. These are presented in the following chapter.

4 Experienced benefits of employee-driven service development

In this chapter findings considering employees' experiences about employee-driven service development instruments are presented. The results are summarized in Figure 4. Particularly, we highlight the importance of open communication, meaningful development, and grass-root level development.

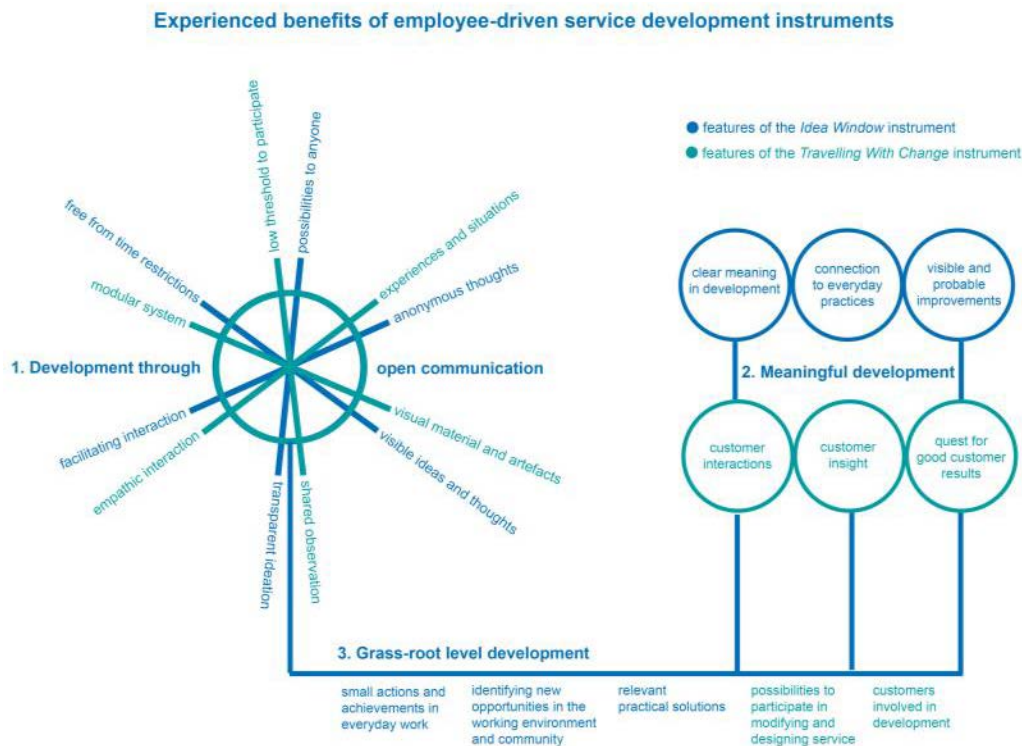


Figure 4. Experienced benefits of employee-driven service development instruments.

4.1 Development through open communication

Respondents brought up the benefits for communication that the new development tools involved. In the respondents' speech open communication is in fact depicted as a key factor in changing the practices of work community.

It was found important that the tools used in the project opened up possibilities to anyone in the work community, regardless of one's role or status, to anonymously present their thoughts. The Idea Window also appeared to be a practical tool to make ideas visible and to store them. Collecting the ideas made the ideation more transparent and concrete, which was seen beneficial in the hectic reality of a hospital organization where new ideas are often born along with the work and soon forgotten.

"Idea window has made it easier for people to bring up their thoughts/suggestions for renewal. When problems are visible to everyone there will be more suggestions for improvement and people more responsively tell about their thoughts when you have the possibility to anonymously propose ideas." (written answer, nurse 5)

"[...]And the best thing is that it's anonymous. So anyone had the opportunity to put their thoughts there and when you received a message from a patient it was brought there directly, and it's not just forgotten, we discuss about it, it's written down." (interview, nurse 1)

"There's a lower verge to go to write when there are no names." (interview, nurse 3)

Not only was the Idea Window appraised as a one-way channel to express and share ones' thoughts but it was also seen as a facilitator of interaction among employees. The opportunity to comment ideas presented by others and to make suggestions for developing them further opened up new possibilities for communication free from time restrictions caused by hectic reality in hospital or different shifts at work.

"Through idea window I understood things that I sometimes think about but I haven't realized that others think about the same things. I just never haven't mentioned about some things. Others might have a solution which you can't figure out by yourself." (written answer, nurse 4)

"[In idea window] Feedback comes so fast and it's possible to fast react. And it's open to everyone. Everyone can see it and it feeds itself -- it brings discussion at best." (interview, doctor 2)

“Each made it [wrote ideas] when they found the time. You didn’t have to write anything, you could read, you could make suggestions. So in that sense it was very good that it wasn’t scheduled to some specific time – it was always there. And you could go there when you felt like you have time. When the idea came up you wrote it and when something came from the patients you just went fast to write.” (interview, nurse 1)

“The trial didn’t take time from patient work but instead each made suggestions when they had the time and when they felt like it.” (written answer, nurse 1)

Open communication turned out to be experienced as a key component of successful developing also among LSC-groups. The co-designed instrument was to complete the existing set of supporting material in a good way, strengthening empathic interaction between the group members and supervisors, opening a new channel for sharing the observations and findings, gathering and visualizing customer experiences and situations, and lowering the threshold to participate in the joint development.

The LSC-groups in Central Finland Health Care District are co-created in collaboration with supervisors and developers. The developers have designed a rich set of supporting material, which is actively utilized in the groups. The material includes instructions, recommendations and hints for lifestyle change, and most are related directly to health promotion. The set is constantly revised. As a result, the supervisors receive a package with which it is relatively easy to launch new LSC-groups. In our research project developers were willing to experiment which kind of material they could co-design with the supervisors by bringing a group member and his or her experience and activities as the starting point for the development of the group activities. The aim was to create empathic interaction between the developers, supervisors and the users. The co-designed instrument was supposed to increase the real-life interaction between the employees and the customers. As one of the developers said “We may have too high-level ideas, where the customer’s everyday experience is.” (video, developer 1)

The developers and supervisors of the LSC-groups created Travelling With Change package to support co-operation process. Material was designed together with the group members to enhance the collection of different life stories and experiences. The aim was to increase the engagement of the members with the group and with their own lifestyle change. However, Travelling With Change package was also designed to support the work of the supervisors and developers. With the help of the material it is easier for them to follow the progress of the group members and their experiences of the group in its different phases and thus share observations.

In the best-case scenario Travelling With Change material collects and visualizes the customer experiences and situations. By evoking new thoughts and different interpretations the material may lower the threshold in taking up more sensitive personal issues in the group. Material was designed as visual as possible so that textual content and complexity was reduced to its minimum so that the material would not feel too overwhelming and would lower the threshold to participate in the discussion. The flexibility and modularity of the system is also perceived as a way to increase open communication within the groups as well as in the LSC-group development activities. A collection of cards was perceived as a natural format of the material for many employees. “If it were a starting picture that could be changed. Why not a collection of cards that could be used in different ways [...] Cards could be used in the group and alone.” (video, developer 3)

4.2 Meaningful development

When describing their experiences about various development projects respondents expressed strong frustration in the kind of developing in which the meaning was not clear for them. In these projects, it is difficult to find incentives for participating in development activities. If the connection to practices is seen weak not much value is given to the project, rather it is experienced as useless extra work.

“If it [developmental project] requires a lot of extra thinking or if it has not been presented clearly to us or if the point and benefits have not been marketed well to us -- then you react to it in a more aloof manner.” (interview, nurse 2)

Developing is experienced as important and meaningful if it is connected to the everyday practices in one’s own work and if the improvements are visible or highly probable. To get motivated, clarifying the link to practice seems evitable. This viewpoint was strongly emphasized especially among nurses. From this point of view developing is not successful if it is “too far from the practices. That you think too scientifically without facing the patient.” (interview, nurse 1)

What was brought up several times by the respondents when reflecting their experiences about the project was that the project especially directed one to think about the actions even more strongly from patients’ point of view. In evaluating the importance of developmental actions what counts most are the benefits they might produce to patients. Patients’ viewpoint is an important source of motivation and a central point in legitimating developing both among nurses and doctors.

“The targets of our work are patients, and their good care is the motivation why you do this work.” (written answer, doctor 1)

"You always think about the patient's viewpoint but maybe along with this project you really stopped to think about their experience." (interview, doctor 1)

"[After the project] you pay attention to the patient's viewpoint more." (interview, nurse 1)

The LSC-group supervisors (nurses) felt that customer encounter is often challenging. The customer can avoid of talking the actual issue by talking around. Identifying of customer's actual situation and needs would require a number of individual meetings and much discussion. The group members are a mixture of people who have multiple problems with health and life situation. The employees try to find the ways to support both the people who are really trying to make a change in their life and the people who are just adapting to a new situation.

"There are so many this kind of people who live their life through other people. This type is very common in the groups." (video, developer 1)

"It would take perhaps several moments that she [patient] gets to the point. She must tell two or three times what her daughter or husband has eaten, or how her children eat and move. Before you get there, to her, who has come to the reception." (video, supervisor 1)

"The group consists also of people who have newly received a diagnosis. These people I experience extremely difficult from the steering point of view. One may process the adaptation to the new situation. It would be better for that person to get adaptation training and not to join the lifestyle change group. This relates to the allocation [of service or guidance]." (video, developer 3)

In one workshop, the developers and supervisors of the LSC-groups agreed on that the lifestyle change support material should help group members to mirror their life situations in relation to their personal history and social networks. The health care professionals often have to open very challenging and sensitive topics in discussion with the patient and according to the LSC-group professionals it is one of the key factors to achieve positive results with the patient. Therefore, the careful and comprehensive study of the patient is one of the main conditions to provide good service. In the LSC-groups, the initial situation is also often difficult because the group members do not usually have clear thought of their situation or view of the target. Thus, the material package should function as an initiator and amplifier helping group members to frame and review their situations privately but also in the group meetings with the health care professionals.

"Now, it is tempting to say that this is one important question in our self-help book [LSC-group support material] context - mirroring own life to the very own family background. Somehow I feel that this will be extremely relevant in this case." (video, developer 2)

"Target may not be clear. Maybe they haven't internalized their own targets." (video, developer 1)

"Tools would give that person an opportunity to begin to consciously seek change and to go towards the new." (video, developer 1)

"Material can tingle a little bit, just positively, so that a person learns to identify his own special features and strengths." (video, developer 3)

4.3 Grass-root level development

Related to the experiences of meaningful development, respondents find important the kind of developmental actions that are realized on grass-root level and in close co-operation with those who do the work in practice. Challenges for motivation seem to occur if the ideas for developing come from outside or top-down, without concretely understanding the grass-root level reality.

"When employees can themselves think about suggestions for how to correct things, these [ideas] are tested more bravely." (written answer, nurse 1)

"There exists excitement in the work community to develop, people just need to be asked and they must be participated." (written answer, doctor 3)

Ideas of participating, co-designing and entrepreneurial way of acting (intrapreneurship) were fundamental starting points in our research. This concrete 'doing' from real needs of the workers and patients, and the aim to empower the grass-root level professionals can be seen as key points that made people at the case organizations participate in and get excited about the project.

"The best ideas come from those who physically work in the centre of where things happen, from midwives in this case. I think not many doctors put their ideas there [to idea window] (more distant relationship to practices?).-- I find it extremely important that actions are developed in co-operation with those who concretely do the work, perhaps together with those who've got the tools." (written answer, doctor 1)

“This is how it [developing] should be, that it’s targeted to us, that you act on the field so clearly.” (interview, nurse 3)

“Now there are more and more these [projects] that nurses start to develop or nurses and doctors in pairs develop. In this way it’s clearly more holistic. -- When the suggestions to change come from ourselves and not from what the administration says they are certainly much easier to accept.” (interview, nurse 1)

As in hierarchic hospital organisations major changes are very slow to realize, our project aimed at bringing attention to the small acts and achievements in every day work. Identifying new opportunities in the working environment and community was facilitated with the developmental tools.

“It is easier to bring up ideas/problems/solutions via idea window. If the solution is the kind that it doesn’t require organizational or structural changes it is easier to take forward. But if some bigger changes are needed it hardly happens.” (written answer, nurse 4)

Respondents reported that the Idea Window had produced small, concrete improvements in everyday work that were realized already during the project. For instance, handrails at the patients’ toilet been long missed were finally acquired, and the medicine cabinet was re-situated to better serve everyday actions and without disturbing patient operations. One example of the proposed solutions was based on the observation in which the patient had to wait twice to meet both the nurse and the doctor during the same visit. In the Idea Window, this observation generated the proposal in which all patients should go systematically first to the nurse and move flexibly from there to the doctor. These examples show how even the simple solutions can open a way to reduce patients' frustration and to incrementally improve the quality of service. The employees themselves can take many practical solutions that are relevant for the development of services and gradually get engaged in also more complicated service development.

However, respondents clearly experienced that concrete changes were still to come. They found it to be too early to evaluate which of the ideas would be implemented, when, how or by whom.

In the case study of the Life Style Change groups, the data generated in user participatory workshops stimulated the group leaders and developers to think their attitudes toward work. They noted that it is important that employees are able to apply large amount of knowledge and skills in work but they also should have a profound customer insight and possibilities to participate in modifying and designing service offering on grass-root level. Getting to know customer's ideas and needs can be a good way to strengthen understanding of what is the core of the service, and which parts of the service can be changeable and customizable. The group developers and supervisors wanted the Travelling With Change material to be a collection of relatively simple tools and instructions, but including also own thinking reviving tasks. They began to see the material as a tool or instrument that allows members and instructors of the group to shape the service together without losing sight of the central content and objectives.

“For us professionals it is typical that we harvest all the knowledge when we meet the customer. The customer's experience, however, is that it really wants simple things. The story plot is there that a person can get closer to the new over and over again through the simple things. I will say, the more I have made this group activity work, the simpler I would like to modify the body of the service. We have tried this, yes, but in reality things are rambling too much in all groups.” (video, developer 2)

5 Conclusion and discussion: Preconditions for engaging health care professionals in employee-driven service development

In this study, we showcase two service development instruments that were co-designed in two large public health care organizations. The initial aim and approach in the two projects were slightly different. Nevertheless, in both cases the development of the instrument enabled open communication, meaningful development, and grass-root level development. These features are important in a service development instrument in order to ensure EDI in the context of public health care. In both cases, co-designing a tool seemed to be a suitable and practical starting point to get employees interested in collaboration and to participate actively in project representing a totally foreign way of thinking and action.

The Idea Window experiment enhanced employees to pay attention to full complexity of service development. On one hand, it highlighted the service implementation and performance as important part of the service development, on the other hand it stimulated ideation and quick testing of services during their everyday work practices. Typically, service development involves certain stages from ideation to implementation and testing, each of which has its own time and place in the process. In the Idea Window instrument different service development stages are roughly apparent and neglected to each other in one flexible open communication tool used for gathering information on customer, ideating new service solutions, making quick and simple experiments for service improvements and for monitoring impacts of new solutions in everyday work context. The Idea Window can be helpful in enquiring knowledge and experiences on new opportunities and ideas more comprehensively and participatory. It can be used for gathering

broader and deeper information on the customer behaviour and values, and thus producing a good starting point for employee-driven service development in such hectic and very much routine-based working environment as hospitals.

The Idea Window experiment revealed that co-designing developmental instruments with employees to encourage and to stimulate them in their developmental purposes can help the organization getting beyond the assumptions that block effective and new solutions. Co-designing instruments for collegiate use provides employees a lens to consider their work site and practices from more developmental aspect. They focus on designing an instrument, which should match with their work context and be usable in practice but simultaneously bringing out and triggering variable reforming aspects and efforts of the working community. When designing a developmental tool for their own use, at the same time, they reflect and process their working practices, attitudes, meanings and conditions from multi-dimensional point of view. Employees' reflective process combined with customer information enquiry and analysis creates a very good base for renewing organisation more service-oriented.

In co-designing the Travelling With Change package the employees clearly understood the importance of customer information as a central element in development of the service and were interested in co-designing method or instrument to enable more open and continuous dialog with their customers. The developers of the LSC-groups were motivated to form profound understanding of customer processes and to design methods and tools for increasing customer interactions and strengthen supervisors' enthusiasm for the joint development.

The Idea Window and the Travelling With Change instruments seemed to help employees in recognizing the design and development process as a combination of overlapping phases of inspiration, ideation and implementation. Brown and Wyatt (2007) have called them as overlapping spaces of design thinking process. Rather than preparing a sequence of orderly steps in development process both instruments called the spaces of design in flexible, creative and collective communication and development process taking place in everyday work. As Brown and Wyatt (2007) have noted, design thinking can feel chaotic for the first time but the process makes sense and achieves results, even though it differs from the typical linear and milestone-based processes.

The approach based on EDI and design thinking was applied in a unique way in our project to facilitate EDI in health care sector. Service development tools and methods tested in the case organizations brought attention to the expertise and capabilities of health care professionals as a source of renewal and change. We believe that the same approach and tools could well be applied also in other contexts and more widely in different sectors.

As a theoretical contribution, the action research indicates that health care professionals are motivated to participate in designing and using service development (i.e. service design) tools and methods

- if the process is based on meaningful and practical frames which matter to health care professionals,
- if the process fits with contextual restrictions of healthcare organisation,
- and if employees have possibilities to modify the process and monitor the impacts and to apply the results in multiple ways.

Our project facilitated the ideation in health care organizations to enable rapid development of services. However, there seems to be a gap between the creation and implementation of the ideas. Although some of the shared ideas were implemented already during the project, respondents found it difficult to see how most of the new ideas would be implemented in the future. As one of our respondents put it: "The problem is often implementation, there are no resources/it's difficult to implement and so on. You can create ideas but it's more difficult to take them to practice level." (written answer, nurse 3).

Also, what was not spoken about was who would be responsible for bringing new ideas into action. Based on our perceptions we claim that rapid and more flexible tools and methods are needed for evaluating the ideas to enable faster reacting and implementation. There exists a research gap and need for further research in this area of study although for instance transformative service research literature has increasingly started to pay attention to the issue.

In the research paper, we focus on presenting and analysing the project results which open up new possibilities for more user-centric, employee-initiated, agile health service development and innovation processes in the context of everyday work practice of health sector. We combine the development needs from EDI literature with design thinking orientation in our action research project. Consequently, we discuss the insights for preconditions to engaging health care professionals in employee-driven service development. Co-designing tools and methods with health care professionals is a way to engage healthcare professionals in the service development domain and to support their opportunity identification capability and initiative in service development. Thus, co-designing service development instruments may provide psychological empowerment for nurses in the lower ranks of health care hierarchy.

Our research findings are in line with prior research on EDI in health care organizations. However, more research is needed on improving the incentive system, and the evaluation processes with the co-designed service development instruments. In addition to practical service design this also calls more empirical work on understanding what motivates health care professionals to engage in EDI and what kind of evaluation systems would encourage EDI in the context of public health care. Particularly, our study encourages finding how to design service development instruments that enable open communication, how to evaluate meaningfulness of initiated service development processes, and how to ensure grass-root level development. Based on our study and experience in the field, these are important questions particularly in the context of public health care. To advance our knowledge, we simultaneously call for more related research also in other contexts.

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La gestion des leads, métamorphose des stratégies « métiers » dans le réseau automobile

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L'industrie automobile continue sa mutation dans leurs pratiques commerciales et de l'après-vente. L'unique stratégie de consacrer ses efforts sur la qualité des produits vendus et non sur les offres de services (Bastien et Kapferer, 2012) ne suffisent plus. Les nouveaux comportements des prospects les contraignent à s'adapter en modifiant la gestion des offres de services. L'objectif de cette communication est d'analyser les impacts organisationnels et stratégiques de la gestion des leads dans une concession automobile, de caractériser les nouvelles compétences de chaque acteur impliqué dans ce processus et de s'interroger s'il existe une stratégie commune pour l'ensemble des marques automobiles.

The automotive distributor continues its transformation into their business practices and after-sales. The only strategy to focus its efforts on the quality of products sold and not on service offerings (Kapferer and Bastien, 2012) are no longer sufficient. New consumption patterns leads force them to adapt by changing management service offerings. The objective of this paper is to analyze the organizational and strategic impacts of lead management in a car dealership, characterize the new skills of each actor involved in this process and wonder if there is a common strategy for the all car brands.

L'intégration de nouvelles technologies est devenue indispensable à la performance et à la compétitivité des entreprises. Les constructeurs automobiles, face à la crise et à l'arrivée de nouveaux « pure players » de la distribution et/ou de la réparation automobile instaurant de nouveaux modèles dans la relation client, cherchent à reconquérir le client « perdu » et le fidéliser. Dans une étude précédente (Abramovici et Lande, 2012), nous avons montré les enjeux de transformation de l'expérience des services après-vente. Il s'agit, dans cette étude, de montrer les enjeux et les transformations à l'œuvre dans l'amont du processus, avant même que le client ne soit client.

Même si le marché de la location ne cesse de conquérir des parts de marché, 9 français sur 10¹⁶⁸ souhaitent toujours être propriétaire de leur véhicule. Ce comportement pourrait, à la lecture de cette première donnée, « rassurer » les constructeurs dans leurs relations privilégiées avec leurs clients. Mais les Français, face à la diminution de leur pouvoir d'achat, ont été nombreux à diminuer leur budget voiture en réduisant leurs déplacements et en favorisant l'achat d'un véhicule d'occasion (48% des Français¹⁶⁹).

Sur le marché du véhicule neuf, les comportements des consommateurs varient en fonction de la gamme du véhicule. Le marché des voitures neuves de marque premium (BMW, Mercedes, Audi) se porte bien, conforté par une clientèle fidèle. En revanche, les marques low-cost (Dacia...) attirant 1/3 des français, le marché des marques généralistes historiques (Renault, Peugeot, Opel...) ne réussit plus à capter sa clientèle « traditionnelle ». L'industrie automobile doit réussir sa mutation dans ses pratiques commerciales de l'avant et de l'après-vente.

Longtemps principalement basée sur une concurrence produit et une communication quasi-exclusivement consacrée à la valorisation de la marque et des produits, cette stratégie marketing ne suffit plus (Bastien et Kapferer, 2012). Dans un contexte de crise où le délai de renouvellement de son véhicule s'allonge et où la part du marché des véhicules neufs se réduit, ce sont l'ensemble des services proposés par la distribution automobile (service après-vente, pièces détachées, location...) qui permettent aux concessions de maintenir un chiffre d'affaires couvrant des coûts fixes importants (Donada et Vidal, 2001).

Par ailleurs, les nouvelles pratiques d'achat des consommateurs, dans un environnement où l'information est immédiatement disponible via des sites web contraignent les constructeurs à s'adapter en modifiant la gestion des offres de services et l'organisation de la relation commerciale. Constatant que le marché des véhicules neufs s'essouffle, les constructeurs doivent redoubler d'effort pour endiguer cette hémorragie vers le véhicule d'occasion. Pour cela, de nouvelles stratégies de gestion de la relation client sont mises en œuvre en investissant dans des systèmes d'information permettant d'accroître des échanges de données informatisées entre les différents acteurs présents dans les différents processus de la chaîne logistique.

Après avoir développé et intégré dans leur réseau des progiciels pour gérer l'ensemble des processus de gestion de la relation client (Peelen et alii, 2009), du sourcing ou, encore, le pilotage de la performance, les constructeurs automobiles mobilisent leur réseau pour développer de nouvelles pratiques dans la gestion des contacts commerciaux (les leads) (Bloch, 2012). Il s'agit pour les constructeurs de construire une relation commerciale riche et personnalisée

¹⁶⁸ TNS Sofres, Baromètre « les français & l'automobile » - vague 2013

¹⁶⁹ ibid

en amont du processus de vente, alors que le client n'est qu'un prospect engagé dans une démarche de renseignements. Notre travail souhaite montrer que, loin de n'être que de simples outils, il s'agit bien de nouvelles technologies permissives qui, conformément au modèle de Barras (Gallouj, 1997), sont en train de transformer en profondeur l'efficacité voir la qualité des services autour de l'achat du véhicule neuf.

Dans cette étude, le lead est un « contact commercial plus ou moins qualifié obtenu sur un site web ou une application mobile par le biais d'un formulaire ou d'une adresse Internet » (Bloch, 2012).

L'objectif de cette communication est d'analyser les impacts organisationnels de cette innovation marketing dans une concession automobile, de caractériser les nouvelles compétences de chaque acteur impliqué dans la gestion de ces leads et de s'interroger sur les stratégies des différents acteurs dans cette évolution. L'ensemble de cette étude doit nous permettre de comprendre la diversité des nouveaux parcours client possibles dans un environnement cross-canal et d'analyser les stratégies les plus performantes.

Les enjeux de cette étude exploratoire sont de trois ordres :

Les **enjeux stratégiques** : les nouveaux acteurs impliqués dans le processus et les relations entre les nouvelles parties prenantes doivent s'intégrer à de nouveaux modèles économiques (Abramovici et Lande, 2012).

Les **enjeux commerciaux** : afin d'adapter le rythme de l'entreprise aux besoins perçus des clients (besoin de réactivité, élargissement des plages horaires...) et aux besoins et aux comportements différents des clients selon l'offre de service choisi, le réseau automobile est conduit à développer des stratégies relationnelles différentes.

Les **enjeux des ressources humaines** : Certaines de ces nouvelles tâches sont confiées à la force de vente qui doit évoluer dans ses compétences mais, également, à de nouveaux acteurs répondant à des métiers et des nouvelles fonctions inexistantes jusqu'alors ce qui amène à une redistribution des tâches et des responsabilités.

1 Design de la recherche et méthodologie

Cette étude exploratoire vise à décrire et analyser le processus de décision pouvant conduire à l'achat d'un véhicule neuf dans un environnement cross-canal.

Nous examinons cette question du point de vue d'un concessionnaire indépendant disposant de relations privilégiées avec une ou plusieurs marques. Dans cette étude exploratoire, nous nous sommes limitées à l'examen des dispositifs mis en place pour faciliter l'achat d'un véhicule neuf.

L'organisation de l'offre de ce secteur et, en particulier, l'analyse des processus de production interne sont rarement étudiés. En France, les relations entre les directions Marketing des marques (françaises ou étrangères) et leurs réseaux sont compliquées et les entreprises sont réticentes à demander à des chercheurs de travailler sur ces questions. C'est ainsi que les rares travaux de recherche sur ce secteur épousent le plus souvent le point de vue des constructeurs et ne permettent pas de comprendre comment les décisions prises se mettent en œuvre dans les concessions (Bakiri, 2007 ; Gutierrez, 2006.)

Nous étudions les transformations de ce secteur depuis une quinzaine d'année. Notre point de vue, celui des enseignants responsables de formation dans les métiers de ce secteur soit au niveau techniciens supérieur soit au niveau Management (Marketing et Production des Services Après-vente), nous a conduit à avoir des relations régulières et de qualité avec des managers responsables travaillant soit au siège des constructeurs, soit dans des concessions.

C'est dans le cadre de ces relations que nous avons pu comprendre les questionnements des managers en charge de la direction commerciale, dans des concessions, sur la meilleure façon de gérer les nouveaux modes d'interaction avec les prospects : la gestion des lead.

Il s'agit de comprendre, dans le processus de la gestion des leads, quelles sont les nouveaux processus mis en place par le réseau automobile ? Quelles sont les compétences organisationnelles pour construire et piloter ces nouveaux process tels que savoir gérer le travail à distance d'une équipe, savoir mobiliser les ressources clients disponibles et les enrichir, savoir inciter et piloter l'équipe pour accroître les expériences ? Quelles sont les compétences attendues des « conseillers client web » ? Quelles sont les compétences attendues des clients ? Ces deux dernières questions ne seront pas développées dans cette étude.

Une première étude de benchmarking sur le suivi du process d'un essai de véhicule neuf en passant par les sites des marques de constructeurs automobiles distribués en France a permis d'établir comment se déroule ces nouveaux processus et de mieux en comprendre leur spécificité par rapport aux processus de vente traditionnel. Quel est le temps de réaction du constructeur et de son réseau ? Quelle est la forme des réponses et des prestations proposés ? Comment est contrôlé le comportement du client ?

Une seconde étude qualitative exploratoire à l'aide d'entretiens auprès de directeurs de sites (3), des directeurs commerciaux (3) et de directeurs après-vente (3) couvrant une marque premium et huit marques généralistes, a mis en évidence les enjeux des nouveaux processus mis en place. Comment les tâches sont réparties et à qui ? Comment sont perçues ces nouvelles stratégies ?

Dans cette étude exploratoire, notre propos est de mettre en évidence le processus générique (Bakiri, 2007) induit par ces innovations technologiques, d'en proposer une description permettant de mieux en appréhender les enjeux relationnels et de production de service puis de proposer une première typologie des modes de gestion des leads, issus de nos entretiens avec les directeurs de sites et commerciaux.

2 Un contrôle organisationnel pour optimiser le parcours client

Chaque constructeur développe son propre réseau de distributeurs/réparateurs composé de concessions et de succursales. Tandis que les succursales dépendent directement de la société mère (constructeur), les concessions peuvent appartenir à un groupe multimarques (regroupement de plusieurs concessions n'appartenant pas à une même marque constructeur). Cette configuration n'avait pas été un frein, jusqu'à présent, dans les relations entre constructeur et son réseau de distributeurs. Une relation privilégiée existait entre eux où chacun avait un rôle bien défini, l'un fabriquait et communique au niveau national sur ses produits tandis que le second vendait et réparait tout en communiquant localement. L'apparition des sites internet n'ont pas changé ces prés carrés. Chacun avait son site vitrine distinct et dédié à une seule marque.

Dans le but de vouloir capter le client à la source de son processus de décision lors de l'achat d'un véhicule d'occasion, les distributeurs ont concédé une partie de sa communication web aux infomédiaires (l'argus, eBay, La centrale...) spécialisés dans la vente de véhicules d'occasion. En s'intégrant sur ce marché, les infomédiaires ont créé une étape à la source du processus de décision du client et le réseau a dû s'adapter au mode de diffusion choisi par les infomédiaires pour la gestion des leads, principalement par mail. Ainsi, le service commercial des véhicules d'occasion, chez un distributeur, a été le premier dont les pratiques ont dû évoluer.

Puis pour redynamiser le marché du véhicule neuf, le constructeur a pris l'initiative de créer du trafic dans les show-rooms que le client désertait en proposant depuis leur site vitrine une nouvelle offre de service « la prise de rendez-vous pour l'essai d'un véhicule ». Pour cela, il imposa un processus de la gestion des leads, en provenance du site « constructeur », à son réseau avec des modalités et un temps de « traitement du lead¹⁷⁰ » en moins de 4h puis de 2h. Pratiquement dans le même temps, les distributeurs ont pris également l'initiative de proposer la même offre sur leur site en développant leur propre processus de gestion des leads, en provenance de leur(s) site(s) mono-marque ou multimarques.

Puisque aucun standard de diffusion des leads n'existe, chaque protagoniste a essayé d'imposer son processus et ses méthodes de pilotage. Le problème rapidement rencontré par le réseau a été d'adapter leur système d'information et d'intégrer différentes pratiques auprès de leur personnel pour des objectifs commerciaux différents.

C'est dans ce contexte un peu chaotique où chacun essaye d'imposer « son » process que le prospect et le personnel en contact ont dû s'adapter.

2.1 Du processus générique de la gestion du lead aux processus particuliers

Quel que soit l'origine du lead, site constructeur, distributeur ou infomédiaire, il convient de distinguer les différentes étapes possibles de la gestion du lead qui sont :

- Génération d'un lead
- Confirmation au client de la réception de sa demande
- Qualification du lead
- Assignation et allocation du lead
- Prise en compte de la demande du client
- Suivi (pilotage) des leads

Un prospect, après consultation du site, va **générer** un lead en remplissant un formulaire en ligne. Dès qu'il l'a validé, le prospect peut recevoir une confirmation.

La préoccupation des professionnels est, généralement d'avoir un contact le plus tôt possible dans le parcours du client mais, surtout, d'informer le prospect que sa demande a été effectivement prise en considération et qu'elle est une priorité pour l'entreprise. C'est la raison pour laquelle beaucoup d'acteurs (mais pas tous) ont choisi d'envoyer une réponse automatique par l'affichage d'un message instantané. Cette première réponse peut être suivie d'une **confirmation** par courriel personnalisée.

Ce lead va ensuite être **qualifié** par l'acteur le recevant, cette qualification pouvant être faite automatiquement ou manuellement.

Enfin, le lead est **assigné** à un personnel commercial et les moyens nécessaires pour le traiter (temps, supports, propositions commerciales) sont **alloués** en conséquence.

Si la génération du lead n'est faite qu'une seule fois, il n'en va pas de même pour les étapes suivantes. En effet, ces dernières seront identifiées autant de fois qu'il y aura d'intermédiaires sans pour autant avoir les mêmes tâches répertoriées.

Par exemple, un client demandant un essai de véhicule en se connectant directement sur le site du constructeur (une étape) sera pris en charge par ce dernier qui utilisera les informations collectées pour alimenter ses bases de données marketing puis le redirigera, selon des modalités variables, vers un ou plusieurs concessionnaires. Ces derniers, en fonction de leur propre organisation et processus, collecteront à leur tour les informations transmises par le client.

¹⁷⁰ Le « temps de traitement du lead » par le réseau, défini par le constructeur, représente la durée maximale accordée pour essayer d'avoir un 1er contact avec le prospect et mettre à jour la base de données du constructeur. Ce temps de traitement est décompté en fonction des plages horaires d'ouverture du distributeur.

Lors de ce processus de gestion, il est donc important de distinguer les différents acteurs intervenants dans ce processus

- Le **prospect** qui peut être déjà considéré comme client par le distributeur
- Le **constructeur** gère une marque avec un réseau de distributeurs. Depuis son site vitrine, il peut être possible, pour le prospect, de faire une demande d'essai de Véhicule neuf, d'accéder aux offres du réseau de véhicules d'occasion et, parfois, de prendre un rendez-vous pour un entretien
- Le **distributeur** peut gérer une seule ou plusieurs marques de constructeur et appartenir à un groupe lui-même monomarque ou multimarque. Depuis leur(s) site(s) internet, il offre la possibilité au prospect/client de faire une demande d'essai de Véhicule neuf, d'accéder aux offres du distributeur ou de tout le groupe de véhicules d'occasion et, parfois, de prendre un rendez-vous pour un entretien ou de faire une demande de renseignement auprès du service après-vente
- L'**infomédiaire** publie toutes les offres de véhicule d'occasion quel que soit la marque, le distributeur ou le type de véhicule

Table 1. Processus générique de la gestion du lead.

Process	Lead	Prospect/client	Constructeur	Distributeur	Infomédiaire
Prise de rendez-vous	Génération de lead	Lead généré par un tiers ou lui-même quel que soit l'heure et le jour depuis son ordinateur, tablette ou téléphone	Mise à disposition d'un service client : formulaire ou messagerie électronique ¹⁷¹	Mise à disposition d'un service client : formulaire ou messagerie électronique	Mise à disposition d'un service client : formulaire ou messagerie électronique
Gestion de la demande	Confirmation	Réception du message électronique	Réponse automatique au prospect par pop-up ou mail	Réponse automatique au prospect par pop-up ou mail	Réponse automatique au prospect par mail
	Qualification du lead		Mise à jour de la base de données prospects et distributeurs	Mise à jour de la base de données prospects/clients	Mise à jour de la base de données clients et distributeurs
	Assignation et Allocation du lead		Assignation et allocation du lead au distributeur désigné par le prospect ou pas	Assignation et allocation du lead au référent du service, à une personne ou dans un pot commun	Transmission du lead au distributeur désigné
Confirmation du rendez-vous par le service commercial dédié	Suivi des leads	Répond ou pas au(x) sollicitations du commercial		Commercial contact le prospect (jusqu'à trois tentatives).	
		Si le prospect répond et accepte un rendez-vous	Mise à jour de la base de données du constructeur par le commercial	Commercial contact le prospect par mail ou téléphone et propose un rendez-vous Mise à jour de la base de données du distributeur par le commercial	
		Si le prospect ne répond pas	Mise à jour de la base de données pour le suivi, le lead est classé. Considéré comme « lead perdu »	Commercial contact le prospect (jusqu'à trois tentatives). Mise à jour de la base de données pour le suivi, le lead est classé. Considéré comme « lead perdu »	
		Si le prospect ne souhaite pas donner suite	Mise à jour de la base de données pour le suivi, le lead est classé. Considéré comme « lead perdu »	Mise à jour de la base de données pour le suivi, le lead est classé. Considéré comme « lead perdu »	

La mise en place d'un processus de gestion des leads par un constructeur fait naître des interactions avec ses distributeurs pendant le parcours client qui, jusqu'alors, n'existaient pas. Il en est de même pour un distributeur entre sa direction et son équipe commerciale.

¹⁷¹ Il n'a pas été retenu le service client par téléphone dans cette analyse.

Ainsi, comme cela a été précisé précédemment, nous retrouvons les mêmes étapes génériques (Qualification, Confirmation, Assignment/Allocation, Suivi) pour chaque intermédiaire. La multiplication du nombre d'intermédiaires peut avoir une incidence notable sur le parcours du client.

2.2 Les stratégies mises en place pour s'adapter aux nouveaux comportements du prospect/client

La grille d'analyse qui suit (Abramovici et Lande, 2012) a pour objet d'analyser l'environnement de la coproduction pour l'achat d'un véhicule neuf dans deux situations possibles : un contact classique, où l'essentiel de la relation de service se déroule en face à face et un contact commençant par un lead, en réponse à une action promouvant l'essai d'un véhicule.

Dans ces deux processus, c'est le client qui initie la relation de service. Le rôle du personnel en contact est de comprendre la nature de la demande du client et, en particulier, son degré d'engagement afin de savoir si la visite relève d'une prise d'information voir d'une curiosité ou bien si elle est la première étape d'un processus d'achat.

La principale différence est la servuction (Eiglier et Langeard, 1987) environnant les étapes amont de ce processus ainsi que les signes qui permettent (plus ou moins) aux acteurs de la relation de service de procéder à une évaluation de l'intérêt du client.

Nous avons repris la grille d'analyse proposée par Codello et alii et déjà mobilisé dans une autre étude sur le secteur automobile pour mettre en évidence les principales différences qui découlent de l'évolution du processus d'achat.

Nous avons en effet montré dans un travail précédent (Abramovici et Lande, 2012) que cette grille facilitait l'explicitation du modèle de coproduction (Codello et alii, 2012) et l'analyse des ressources du système de production de service mobilisés dans la relation de service.

Table 2. Environnement de la coproduction pour l'achat d'un véhicule neuf.

Caractérisation des dispositifs de contrôle	Dans le modèle de coproduction normal	Demande d'essai d'un véhicule
	Face à face	À distance
Sur quoi s'exerce le contrôle du comportement du client ?	Sur la pertinence de la demande du client/prospect Sur le résultat de la vente d'un véhicule neuf ou d'occasion	Sur la pertinence de sa demande au vu de l'état des informations disponibles dans la messagerie électronique Sur les échanges et le niveau d'engagement fait entre le client/prospect et le vendeur Sur le résultat de la vente d'un véhicule neuf ou d'occasion Sur les connaissances du client (normes d'entretien, capacité à détecter et interpréter des anomalies de son véhicule)
Qui contrôle le comportement du client ?	Le vendeur lors de la vente	Les différents acteurs professionnels gérant le lead et le prospect lors de la vente
Quand le contrôle organisationnel des comportements du client a-t-il lieu ?	Essentiellement à la validation du contrat de vente par le client et son départ	Lors de la qualification du lead (contrôle amont) Lors des différents contacts avec le client (accepte ou refuse de répondre ou donner suite aux messages...) A la validation du contrat de vente par le client et son départ
Quels sont les processus de contrôle organisationnel des comportements du prospect ?	Contrôle par le vendeur (par rapport aux données connues et aux informations du client)	Contrôle des données, avec le client, avec possibilité d'une participation active du client (décisionnaire de la relation) Par le vendeur : Appel du prospect (si coordonnées disponibles) Envoi d'un mail (si coordonnées disponibles)
Quels sont les moyens de contrôle organisationnel du client ?	Base de données du distributeur	Base de données du distributeur et du constructeur

Caractérisation des dispositifs de contrôle	Dans le modèle de coproduction normal	Demande d'essai d'un véhicule
	Face à face	À distance
Quelle est l'attitude du client contrôlé ?	Aliénation (le client est dépendant d'une expertise externe) associée à une méfiance du client	Implication associée à une attitude plus experte du client : capacité à intégrer des informations liées à son véhicule, capacité à prendre des décisions (accepter ou non)

3 Une gestion des leads dépendante du leadership des acteurs

Chaque intermédiaire a mis en place des dispositifs de contrôle qui permettent de suivre l'évolution du traitement de lead.

Pour le cas de l'essai d'un véhicule neuf, il existe deux niveaux de contrôle organisationnel suivant l'origine du lead

Si le lead est généré via le site d'un constructeur, il existe alors deux dispositifs de contrôle : un par le constructeur et un autre par le distributeur.

Si le lead est généré via le site du distributeur, uniquement le dispositif de ce dernier est mis en action.

Certains constructeurs ont mis en place une gestion des leads générés sur leur site via un intranet dédié. Dans ce cas, il est attendu que tous les acteurs (constructeur et distributeur) qui interviendront pendant le processus de gestion du lead se connectent et complètent au fur et à mesure de l'évolution du traitement du lead depuis l'intranet du constructeur. Ce dispositif permet au constructeur de suivre la gestion du lead en temps réel mais cela n'exclut pas le personnel en contact de mettre à jour la base de données du distributeur.

Si du point de vue du constructeur, il y a un support de gestion des données unique, du point de vue du distributeur, surtout s'il est multimarques, c'est plus variable (n intranet pour n constructeurs, avec des structures de données différentes...). Selon les droits d'accès aux données qu'il a, les possibilités d'exports vers d'autre(s) système(s) ou l'absence de communication entre les systèmes engendrent une multiplication des tâches identiques.

Ce dispositif d'intranet permet au constructeur d'être intrusif dans la gestion des activités du personnel dans tout le réseau. Il lui est possible de contrôler la performance de l'ensemble du personnel. Il lui sera possible d'être plus interventionniste dans le management des équipes et/ou, tout au moins, d'identifier les besoins de formation pour réduire les écarts de pratiques au sein du réseau indépendamment du distributeur.

La mise en place de ce processus multipartie-prenante permet d'initier un partage d'informations cohérentes (sur le prospect). Ainsi, même si les différents acteurs s'appuient sur des systèmes d'information propres, la gestion des leads permet à ces différents acteurs de récupérer une partie des informations générées via les actions d'un autre acteur. Ce nouveau mode relationnel permet donc aux constructeurs de s'engager dans un processus de capitalisation des informations commerciales générées par leur réseau de distribution.

Un aparté est nécessaire pour comprendre le caractère "nouveau" de cette évolution. Une des contreparties entre un constructeur et un distributeur (qu'il soit succursale ou indépendant sous contrat) est le partage d'un certain nombre de données commerciales. Cependant, jusqu'ici, ces données ne permettaient pas d'analyser le comportement du client tout au long de la "consommation" de ce produit-service qu'est le véhicule automobile. Très riche sur les conditions environnant l'acte d'achat (données personnelles, financières, type de véhicule acheté...), elles s'appauvrissaient dès lors que le client s'affranchissait du réseau de distribution dans le cadre de l'entretien de son véhicule. Même quand un client restait fidèle à un réseau, la qualité des informations sur la nature des travaux réalisés était très variable dès lors que ces prestations sortaient du cadre des contrats de service ou de garantie constructeur. Enfin, même si le réseau était incité à alimenter de façon proactive la base de données relatives au client si il était informé de changement dans ces données personnelles (naissance d'un enfant, déménagement...), le taux de remontée du distributeur vers le constructeur était faible et de qualité médiocre.

Avec la mise en place de la gestion des leads, l'enrichissement des bases de données ne se font pas sur l'aval (le service après-vente) mais sur l'amont (la recherche d'information (dont l'essai de véhicule constitue un moment de vérité (Normann, 1994) de l'acte d'achat. Pour autant, ce que cette étude exploratoire a permis de révéler est l'engagement des différentes parties prenantes dans l'alimentation de ce processus virtuel.

3.1 Un management des leads dépendant d'un leadership

Si le constructeur peut intervenir à l'aide d'un support de communication (intranet) pour la gestion du lead, il ne peut pas, pour l'instant, imposer un mode de gestion et de management du personnel dans le réseau.

Actuellement, il existe trois possibilités pour un distributeur de qualifier un lead : lead récompense, lead open bar et lead efficacité. Suivant le mode choisi, le lead a une fonction et/ou un statut spécifique au sein de l'organisation. Cette gestion aura des répercussions sur le management des équipes et des objectifs fixés individuellement ou collectivement.

Lead « en récompense » : un outil de gestion des ressources humaines : Dans ce mode de gestion, la qualification du lead est centralisée. Le responsable de la qualification assigne un lead à un acteur et un seul sans autre incitation. Les responsables de chaque service considèrent en effet qu'un lead, par principe, permet

d'aboutir à une vente plus facilement. L'attribuer à un collaborateur revient donc à augmenter son potentiel de vente et donc de primes. Ainsi, le responsable assignera le lead en fonction de différents critères qui sont indépendant du prospect tel que le niveau d'implication du commercial (dans le bon fonctionnement du show-room, par exemple).

Lead « Waiting pool » : un outil d'animation commerciale : Dans ce mode de gestion, l'ensemble des leads entrants sont regroupés dans un espace ouvert où le principe est « premier arrivé, premier servi ». Il n'existe aucun arbitrage entre les vendeurs sur leurs actions commerciales pour la mise à jour du site, la réactualisation des données avec les partenaires.

Lead « Customer/Product knowledge » : un pilotage global cherchant une réponse sur mesure. Les responsables de service souhaitent motiver et surtout modifier les pratiques de leur équipe pour augmenter l'efficacité globale. Pour ce faire, il tente d'arbitrer entre une gestion équitable entre tous les commerciaux permettant le temps de réponse le plus court et une allocation optimisée visant à attribuer le contact au « meilleur » vendeur en tenant compte de

- leur performance commerciale : plus le vendeur arrive à conclure une vente pour un produit donné, plus le responsable est enclin à lui assigner le lead
- leurs connaissances techniques du véhicule : plus un vendeur a des connaissances d'expert sur un véhicule et qui vont au-delà de celles d'un client expert, plus il réussira à conclure la vente

Table 3. Qualification du lead dépendante du management des équipes commerciales.

Lead \ Qualification	Qualification inexistante	Qualification en fonction des commerciaux	Qualification en fonction du lead
Lead « en récompense »		Implication des commerciaux dans leurs activités	Implication des commerciaux dans leurs activités
Lead « waiting pool »	Performance des commerciaux Accroître la compétitivité des collaborateurs		Disponibilité du commercial Ou Équipe commerciale réduite
Lead « customer/product knowledge »		Résultats des commerciaux Connaissance produit Priorité à la vente	Résultats des commerciaux Priorité à la vente Connaissance produit et/ou client

3.2 Des indicateurs de performance pour un management intrusif

Deux familles d'indicateurs de performance ont été mises en place pour optimiser la gestion des leads. La première se focalise sur la connaissance de ses prospects en devenant de plus en plus exigeant sur la qualité des données. La seconde évalue la performance d'une Supply Chain mise en place par le constructeur et le réseau (Baron et Fender, 2012) à celui du parcours client.

Maitriser les données de ses prospects...

Traditionnellement, c'était à l'initiative des commerciaux que les informations liées aux prospects étaient recueillies. Le lead a inversé la prise d'initiative. Les constructeurs ont mis en place tout un process pour avoir une maîtrise des données du prospect. Leur atout majeur a été de donner la main au prospect qui est maintenant à la source de l'initiative de la création de son « compte ». Puis, ils ont incité leur réseau à mettre à jour directement sur leur propre système d'information les informations recueillies sur les prospects/clients. Ces deux actions permettent de définir le **lead scoring** de chaque distributeur, chaque commercial. Ces leads scoring permettent aux constructeurs d'affiner et, surtout, de maîtriser les stratégies de chacun pour transformer un prospect en client dans le court ou long terme. Dans le cas où le prospect ne souhaite pas donner suite à sa première initiative ou les informations disponibles sont erronées ou insuffisantes, le lead peut être considéré comme « perdu » (**lead lost**). Dans le cas contraire, le lead va être classées dans un vivier de comptes de prospects pour des actions commerciales à venir (**lead nurturing**). Les technologies nécessaires pour qualifier correctement les contacts ayant de la valeur pour une relance commerciale, sur le produit recherché ou sur un produit connexe (cas de la revente d'informations) sont complexes à développer et nécessitent de lourds moyens financiers qui ne sont pas à la portée de beaucoup de distributeurs. Ainsi, les constructeurs en maîtrisant les données de ses prospects s'initient dans l'intégralité du processus de conquête des prospects.

... tout en augmentant la performance de la Supply Chain

Sachant que le lead est toujours initié par le prospect quel que soit l'heure et le lieu, il est essentiel pour le constructeur de bien « faire voir » au prospect que sa demande a bien été prise en considération. Ainsi, dès que le lead a été généré, un message électronique automatique, personnalisé ou pas est envoyé au prospect avant même que le lead ait été qualifié. Cette première action du constructeur est là pour « rassurer » le prospect. Cette réponse automatique permet de créer un lien relationnel entre l'entreprise et le prospect et, surtout, de pouvoir évaluer un temps de gestion du lead dans le parcours client (**lead time commercial**) et un temps de traitement du lead réellement consacré dans le processus de production par le constructeur (**lead time réel**). Ainsi, quand il existe une action de réponse automatique, les temps des lead time commercial et réel sont quasi-immédiats.

À partir du moment où le lead est transmis par le constructeur à son réseau, la durée lead time commercial devient supérieure au lead time réel. La gestion du lead dans le processus de production par le réseau nécessite une mobilisation des ressources du distributeur qui doit faire face à des contraintes telles que les plages horaires d'ouverture du distributeur, le nombre d'intermédiaires, les supports de communication choisis, les horaires de travail du personnel concerné et/ou leur disponibilité.

Table 4. Indicateurs de performance par rapport au prospect et la Supply Chain.

Process	Lead	Prospect/client	Constructeur	Réseau
Prise de rendez-vous	Génération de lead		Lead scoring par rapport au prospect	Lead scoring par rapport au prospect
Gestion de la demande	Confirmation	Indice de satisfaction prospect/client par rapport à l'usage du site	Lead time commercial Lead time réel	Lead time réel
	Qualification du lead		Mise à jour de la base de données	Mise à jour de la base de données
	Assignment et Allocation du lead		Lead scoring par rapport au(x) distributeur(s)	Lead scoring par rapport au(x) commercial(aux)
Confirmation du rendez-vous par le service commercial dédié	Suivi des leads	Si le prospect répond et accepte un rendez-vous		Lead scoring par rapport au prospect
		Si le prospect ne répond pas	Lead lost	Lead lost
		Si le prospect ne souhaite pas donner suite	Lead nurturing	Lead nurturing

3.3 Les comportements dysfonctionnels du prospect non contrôlé par le distributeur

Lors de la génération du lead, le prospect doit compléter un formulaire plus ou moins « riche » ou précis (intrusif) suivant les marques.

Il ressort différents comportements dysfonctionnels du prospect qui peuvent être mis en évidence tout au long du processus de la gestion du lead :

Lors de la génération du lead : Données enregistrées par le client

- le client donne ses coordonnées partiellement exactes
- le client complète partiellement le formulaire : lors de la qualification du lead l'absence du numéro de téléphone peut être un critère permettant d'évaluer un niveau d'intérêt
- le client se crée une nouvelle identité

Lors de la qualification du lead : Croisement des données avec le fichier interne au distributeur

- le client a également pris contact par le site d'un ou des distributeurs appartenant à une même marque
- le client a déjà demandé des renseignements directement à la concession, il est connu par un vendeur. Les informations le concernant sont déjà enregistrées dans la base de données

Lors du suivi du lead (après assignation et allocation du lead)

- le client ne donne pas suite aux appels ou messages du personnel en contact

Ces données brutes auraient un intérêt économique (par exemple, en priorisant certaines demandes) pour le distributeur. Elles devraient permettre de mieux qualifier le lead afin d'optimiser le parcours du client.

Ces données devront être croisées ensuite avec les indicateurs de performance (lead scoring, lost et nurturing) afin de réduire les comportements dysfonctionnels ou en tout état de cause, d'en réduire les conséquences opérationnelles. La maîtrise de ces données faciliterait de ce fait la définition de nouvelles stratégies de gestion des parcours client.

Même si certains comportements peuvent être supprimés, notamment la mise à disposition de toutes les informations attendues dès la génération du lead, par un système d'information plus « verrouillé », il serait trop hâtif de retenir cette solution. La gestion des leads étant ressentie pour les distributeurs, il serait prématuré de définir des stratégies pertinentes dans la valorisation directe et indirecte.

Les constructeurs, en proposant à la fois un système d'information compatible avec les systèmes "maison" de leurs distributeurs et des outils de qualification (lead scoring) utiles ont gagné, auprès des réseaux de distribution, une légitimité nouvelle.

Les responsables des ventes, au sein des concessions, sont unanimes quant à l'intérêt commercial de bien gérer un lead « *Si au départ le lead était considéré comme une contrainte, il est devenu une véritable opportunité pour nos vendeurs.* » (Dirigeant d'un groupe monomarque). C'est bien parce qu'il est plus facile de conclure une vente dans le cadre d'un processus d'achat commencé en ligne et rapidement géré par l'ensemble des acteurs de la chaîne que le réseau de distributeurs a intérêt à s'engager dans ce processus, par ailleurs coûteux en temps et en ressources.

On pourrait en conclure un peu rapidement que l'intérêt du constructeur est de renforcer la capacité de son réseau de distribution à transformer des demandes d'information en ventes de véhicules neufs, favorisant ainsi l'écoulement de ses produits. La bataille de la gestion des leads semblent cependant plus complexes et importantes encore. L'élaboration d'outils permettant le lead scoring, pour être commercialement performant, suppose à la fois des compétences (data mining...) et des données qui ne sont pas à la portée de la majorité des réseaux de distribution. Cet investissement ne peut être fait uniquement par le constructeur. Comment expliquer que ce dernier se lance dans un processus si coûteux et incertain ?

Les bénéfices escomptés sont-ils uniquement captables par le réseau de distribution ?

Cette conclusion serait méconnaître la réalité économique de ces nouveaux processus d'achat. Comme nous l'avons plus haut, avec le principe du lead nurturing, un lead a de la valeur même quand il ne se traduit pas par un acte d'achat.

Dès lors, c'est bien cette capacité à transformer l'information recueillies tout au long du processus de renseignement par le client en de la valeur, à destination du réseau de distribution (court terme), de la marque (moyen terme) voir d'acteurs tiers (court et moyen terme) qui est en jeu.

Conclusion

Nous avons mis en évidence les transformations profondes des pratiques autour de l'avant vente. Nous avons mis en évidence que les nouvelles pratiques des prospects, encouragés par le développement de sites d'information et de nouvelles pratiques commerciales, avaient nécessité de mettre en place une organisation d'un véritable processus de production de service nouveaux, se traduisant à la fois par une diversité de canaux de communication pour attirer le client (dans une optique de cross-canal) mais également par de nouvelles pratiques de collectes et de capitalisation de données commerciales.

Au-delà des transformations sur le processus de production et la répartition du travail au sein des équipes de commerciaux dans le réseau de distribution, nous avons cherché à mettre en évidence les enjeux stratégiques de ces nouvelles pratiques commerciales. Alors que, en commençant cette étude, nous pensions mettre en évidence le poids grandissant des infomédiaires, c'est la nouvelle légitimité des constructeurs que nous avons mis en évidence.

Or d'autres indices (développement de showroom développés et gérés directement par les constructeurs), montrent que les constructeurs sont en cours de réflexion pour développer un e-commerce indépendant de leur réseau de distribution. Il semble cependant que le réseau veuille réagir pour rester un acteur indispensable pour l'achat d'un véhicule.

Ces différents axes de réflexion ouvrent vers de nouvelles stratégies permettant de convertir un prospect en client. Pour l'instant, les constructeurs désirent être à la source de ces innovations. Par la maîtrise de leur base de données, des

processus organisationnels, n'y a-t-il pas une volonté de maîtriser leur réseau ? Par cette action, les constructeurs s'orientent vers une maîtrise de leur réseau en vue d'une uniformisation de l'offre vis-à-vis du réseau tout en recherchant à segmenter l'offre pour le client en créant des parcours client dédiés....

Malgré tout, il ne faut pas oublier les distributeurs : quel vont être leur rôle ? Sachant qu'il y a de plus en plus de groupes multimarques, quelles vont être leurs positions vis-à-vis des constructeurs ?

Rien n'est encore « joué », les innovations technologiques vont avoir un rôle clé dans les stratégies à venir des constructeurs qui auront à composer entre l'évolution du comportement et des attentes des prospects, la place de plus en plus ambiguë de certains groupes multimarques détenant une base de données et des pratiques multimarques souhaitent imposer leur stratégie aux constructeurs.

Ces relations de pouvoir entre constructeur et distributeur, à priori indépendantes du parcours client, ont une réelle incidence sur l'avenir de chacun et l'attribution des rôles attribués. Les constructeurs doivent développer leur propre modèle économique qui peut aller jusqu'à la volonté de la maîtrise du parcours client pour la vente du véhicule neuf, dans un premier temps, en l'intégrant dans leur supply chain.

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Does Lithuanian resorts' branding as the medical, health and wellness destination differ from other Baltic States?

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The aim of the paper is to define whether Lithuanian NTOs, resorts' branding as the medical, health and wellness tourism destination differs from other Baltic States. The qualitative analysis of tourism websites of Lithuania, Latvia and Estonia, their resorts city Council websites was performed. The framework for content analysis of websites of tourism authorities, city Councils is provided in order to monitor the branding tool for medical, health and wellness tourism destination. Guidelines for Lithuanian medical, health and wellness branding for foreign tourists are developed.

Introduction

Traveling outside one's country for medical, health and wellness services is constantly growing in the world. This phenomenon can be explained by different reasons. The first of them is the free movement of goods and services under the auspices of the World Trade Organization and its General Agreement on Trade in Services. It has accelerated the liberalization of the trade in health services. The second one is the Directive 2011/24/EU of the European Parliament and of the Council of 9 March 2011 on the application of patients' rights in cross-border healthcare, commonly known as the Patients' Rights Directive (the PRD). As health care is predominantly a service industry, this has made health services more tradable, global commodities (Lunt et al., 2014). In the tourism industry medical, health and wellness tourism emerges as niche tourism with the growing competition among multiple destinations. These geographic locations possess the resources, attractions, infrastructure and facilities that attract people to visit these places for diverse reasons (Tasci, 2011). The medical treatment, rehabilitation and wellness are often included in the set of tourist intentions. Destinations offer many similar goods such as quality accommodations, beautiful scenic view, and friendly people (Qu et al., 2011). Despite the reasonable price for services, comparable or even better quality, shorter waiting for treatment procedures, and the quicker access to the care (Cormany, Balogdu, 2011); more and more destinations face with rising competition and need to differentiate. Therefore the destinations are forced to rethink their branding strategy.

Destination branding (DB) helps destinations to be known and observable. It is treated as one of the most important factors influencing the competitiveness of a destination. DB enhances a destination's positioning and stimulates tourists' choices and their satisfaction (Del Chiappa, Bregoli, 2012, p. 51). Brand blends functional, rationally assessed performance-based values with emotional values (De Chernatony, 2010, p. 30). Well-known brands influence customers' decisions to buy products, services as well as the destination.

Destination brand can be developed in a variety of ways, i.e. advertising through direct marketing, personal selling, and brochures. Since Internet plays a significant role in attracting visitors and facilitating their trip planning, the website of a destination has become a crucial branding channel (Baggio, 2003; Balakrishnan, 2009; Law et al., 2010; Cormany, Baloglu, 2011) and the most flexible tools for communicating the value for a customer (Fernández-Cavia et al., 2014). Due to the quick information dissemination on the websites many of emerging countries are successfully entering to the global tourism market (Pike et al., 2010; Tang-Taye, Standing, 2013).

The Baltic States – Lithuania, Latvia and Estonia – are in sense new players in world and the EU medical, health and wellness tourism market. Nonetheless they exert in communicating themselves as medical, health and wellness services providers (Smith, Puczkó, 2014). Lithuania has formulated the vision for medical tourism development as “the fastest health tourism growing country in the Baltic and Nord European Region“ (Lietuvos medicinios turizmo plėtros ir medicinios paslaugų eksporto skatinimo galimybių analizė ir rekomendacijos, 2012). This brings a lot of opportunities, as well as challenges for the Lithuanian medical, health and wellness services providers. Growing recognition and enhanced positioning of Lithuanian, Latvian and Estonian resorts as medical, health and wellness destination intensify the competition among these three countries. Therefore Lithuanian resorts as medical health and wellness destinations need to find and communicate their differences and attractiveness for customers using different tools of destination branding.

The aim of the paper is to identify whether Lithuanian medical, health and wellness NTOs, resorts' branding differs from Latvian and Estonian. This research pretends to be one of the first researchers' efforts to try to identify Lithuanian resorts' branding specifics comparing to neighbouring medical, health and wellness destinations, which possess actually the same traditions, resources and other conditions. Websites in the research are analysed as a tool for destination branding and communication with foreign medical, health and wellness tourists.

To achieve this aim, the paper is structured as follows. In Section 1 we discuss the concept of destination branding; Section 2 describes the destination brand positioning; Section 3 deals with the activities of destination marketing organisations (DMOs); Section 4 focuses on research methods and research design; in Section 5 the results of websites content analysis are presented. Finally, we outline some managerial implications for Lithuanian medical, health and

wellness destination branding improvement that should be augment for Lithuanian opportunities to attract EU citizens, note the limitations of our analysis, and suggest ways to enrich this line of the research.

1 Destination branding

Brand is multifaceted concept. Over the years the brand has been defined in many different ways, depending on paradigm from which the brand is perceived (Mitchel et al., 2011). One of the more established definitions of a brand was proposed by the American Marketing Association: brand is a name, term, design, symbol or any other feature that identified one seller's good or service as distinct from those of other sellers. A brand can be defined as a consistent group of characters, images, or emotions that consumers recall or experience when they think of a specific symbol, product, service, organization or location (Simeon, 2006, p. 464); as a cluster of functional and emotional values that promise a unique and welcome experience between a buyer and a seller (Lynch, Chernatony, 2004); as the total sensory experience a customer has with some company and its product or service (Hammond, 2008, p. 14). Obviously, these definitions stress the different key aspects of a brand. According to Brodie, De Chernatony (2009), there will never be a unifying definition of the brand because it is constantly evolving and depending on contexts or lenses through which the phenomenon is viewed. Notwithstanding the different approaches on brand definition there is an agreement that branding must attract and keep customers by promoting value, image, prestige, or lifestyle; it must communicate information, minimize risk or increase trust; help identify or recall key factors, differentiate from competition and facilitate recommendations (Balakrishnan, 2009).

In a destination management context branding is a key differential component of marketing strategy. Destinations are places that attract visitors for a temporary stay, and range from continents to countries, to states and provinces, to cities and villages, to purpose build resort areas. These geographic locations command the resources, attractions, infrastructure and facilities that attract people to visit these places for diverse reasons (Tasci, 2011). Today the customers are offered various destination choices that provide many similar goods such as quality accommodations, beautiful scenic view, and friendly people (Qu et al., 2011). Every country claims a unique culture, landscape and heritage, describes itself as having high standards of customer service, etc. As a result, these factors are no longer differentiators (Hudson, Ritchie, 2009). The destination needs to be unique and differential to be selected as a final decision. As Morgan, Pritchard (2004, p. 60) note, the choice of vacation destination has become a significant lifestyle indicator for modern customers and the places where they preferred to spend their holiday time and income have to be emotionally attractive. In other words, customers' interest is not restricted to purely functional benefits but to the consumption of a total experience (Leighton, 2007). Consequently, the battle for customers in the tourism industry will be fought not over price but over the experiences or "hearts and minds". Experiences involve the senses, the mind, emotions (affect), active/passive participation and social interaction (Gover, Go, 2009, p. 17). Uysal et al. (2011, p. 101) note the different phases of the traveller experience, ranging from pre-trip planning (anticipation stage), to on-site experience, to the post-trip experience (reflective stage). In respect of this viewpoint the destination branding becomes the crucial for places to be identified and differentiated from alternatives in the minds of target customers (Qu et al., 2011).

Destination branding is a way to communicate a destination's unique identity by differentiating a destination from its competitors and combining all things associated with the place (i.e. its products and services from various industries) that collaborate under one brand (Cai, 2002, p. 734). Thus the objective of destination branding is to select a consistent mix of brand elements to identify and distinguish a destination through positive image building. Gover, Go (2009, p. 17) notice that for destinations this is challenging as they attract a diversity of customers and the delivered products and services are often highly customized with the customer in control.

Destination brand is considered as a relational network developed by a destination among itself and certain target markets and stakeholders in order to affirm its own offer (Chiappa, Bregoli, 2012, p. 52). It conveys the promise of a memorable travel experience that is uniquely associated with the destination; serves to consolidate and reinforce the recollection of pleasurable memories of destination experience (Blain et al., 2005). Park, Petrick (2005) stress the key of destination branding to be developed as an emotional link with the tourist. Destination brand exists only if it is able to stake out a position in tourist's mind and not because it has recognized name, distinctive logo, tagline or symbol (Del Chiappa, Bregoli, 2012, p. 52). To realize its purpose destination branding integrates three components – brand identity, brand positioning and brand image. Brand identity reflects how place (it could be country, region, city, resort, etc.) developers want the brand to be. This supply-side approach is strategical, active and looks to the future. Brand image shows how the brand is perceived by tourists and reflects the demand-side standpoint; it is tactical, passive and looks on the past. Brand positioning is now recognized as a key construct in branding (Pike, Mason, 2011) and is the part of the value propositions communicated to a target group that demonstrates competitive advantage (Kavaratzis, Ashworth, 2005). As Pike, Mason (2011) state, the purpose of brand positioning within supply-side and demand-side framework is to enhance congruence through marketing communications between brand identity and brand image.

2 Destination brand positioning

Positioning is viewed as source of competitive advantage. It is important to distinguish between strategic (market) positioning and brand (operational) positioning. Strategic positioning refers to the competitive market standing of a firm

against its competitors; brand positioning focuses on the process of creating and altering perceptions of customers about an organisation's (in our case – destinations) products or brands. Strategic positioning forms the main direction for the development of the brand positioning (Fuchs, Diamantopoulos, 2010). Our research is concentrated on brand or operational positioning. Brand positioning refers to the functional or emotional benefits or 'images' associated with a brand or can indicate to where a brand is seen in a category of a relative to its competitors (Rosenbaum-Elliott et al., 2011, p. 112). The former viewpoint reminds us that all consumer choices are made on the basis of comparison. Hudson, Ritchie (2009) also assert that brand communications can be based around logical features (*mind or head*) or emotional benefits and associations (*heart*) although there is an increasing focus on the latter. These emotional attributes underlie the concept of brand promise, in which destinations must communicate to visitors (potential and/or current) the benefits and experiences that they can expect to receive upon arrival. This meaningful distinction inspires confidence in travellers' purchase decisions and represents the most critical component of the brand (Hudson, Ritchie, 2009). This understanding entails a brand owner/manager to make well-considered choice of which aspects of the brand identity must be emphasized. These chosen aspects have to be relevant to the target group and differentiate the brand from competing brand (Riezebo, van der Grinten, 2012, p. 17). The core of brand positioning is the destination's name, logo and value proposition (slogan) (Pike, Page, 2014). Through right decisions positioning creates a unique, credible, sustainable and valued place in consumers' minds for the brands (Sengupta, 2005, p. 17). Positioning results from an analytical process are based on the following four questions: (1) a brand for what benefit; (2) a brand for whom; (3) a reason, and (4) a brand against whom (Kapferer, 2008, p. 177). Effective positioning ensures that a brand attracts the attention of customers, and that the associations evoked by the communication are sufficiently relevant to get people to buy the brand product. The outcome of the positioning process will have to be that the desired set of associations surrounding the brand name is created in the mind of the receiver.

3 Destination marketing organisations as agent of destination brand positioning

Destination is a complex organizational structure or relational network where multiple and diverse agents (local institutions, hotels, restaurants, transportation, etc.) interact with the aim of providing an attractive tourism experience (Camprubi et al., 2014). These tourism agents, whether autonomously or in a coordinated way, decide on the promotional strategy of the destination. In the latter case there are the organisations named destination marketing organisations (DMOs) that are responsible for destination tourism development. According to Pike (2004, p.14), a destination marketing organisation is any organisation, at any level, which takes charge of marketing of an identifiable destination (i.e. National Tourism Organization (NTO), Regional Tourism Office (RTO), Local Tourism Association (LTA)). The purpose of DMOs is to enhance the competitiveness of their destinations. It needs to present an integrated destination product that encompasses all specific tourist attractions and services provided at that destination. Destination brand is communicated in three different ways: (1) architecture and real place offering, (2) formal communication through official media and (3) *word of mouth* (WOM) reinforced by the media and residents (Del Chiappa, Bregoli, 2012, p. 54). In communication stage DMO is the principal institution that is responsible for destination brand promotion. More and more DMOs are joined to the bandwagon of creating catchy slogans in the name of destination branding as well as other place marketing activities.

But in markets crowded with marketing communications from huge number of rival destinations offering similar benefits competitiveness has become increasingly challenging (Pike, Mason, 2011). In the positioning process DMOs can face with the trouble to create the laconic theme to cut through the noise of competing destinations offering similar products, services and attractions and be noticed by the right audience, for the right reasons, at decision time (Pike, 2012). DMOs are also hampered by various challenges in engaging stakeholders in the overall brand positioning process and appealing to tourists at the same time. They are pressured to harmonize local and regional interests while promoting their brand identities in acceptable way for public and private organizations; they have to confront the culture collision influenced by different values systems of public and private sectors. DMOs of small destination often have the limited budget and lack of human resources to develop differentiated branding strategies to compete with larger destinations (Park et al., 2009, p. 76).

Destination brand can be developed and presented to audience in a variety ways, i.e. advertising, direct marketing, personal selling; some destinations cooperate with journalists, film-makers, etc. (Morgan, Pritchard, 2004, p. 59). A tourism product is intangible therefore a destination is almost entirely depending upon representations and descriptions to help tourists make a purchase decision. Thereby, the availability of up-to-date, accurate, attractive, and accessible information is regarded as crucial for the success of a destination brand.

With the widespread diffusion of the Internet, destination marketing has changed from passive to active promotion, from one-way to interactive communication (Mistilis et al., 2014). The World Wide Web as a global channel offers interactivity and multi-media experience (text, images, sound, and video). With the increasingly popularity of the Internet, tourists will primarily base their decisions about which destinations to visit on the information available to them. Obviously, if using the Internet one DMO can better present its destination than another, so it may win attention of tourists who have some doubts about where to travel. A website is the most advanced medium to address such a need (Beldona, Cai, 2006). Websites enable anyone with an Internet connection access, irrespective of geography, time zone, or computer system to surf and gain information about the country, resort, services, prices, etc. Thus a destination's website has a strategic relevance in order to attract potential tourists. But website does not serve just as an informative

tool. As Beldona, Cai (2006) affirm, it can initiate key emotions, feelings that would eventually enable the purchase decision.

4 Research method and design

For destination DMO website has a significant contribution in its branding communication; it is the central point from which it directs online visitors to attractions and services providers (Beldona, Cai, 2006). Cronin (2003) notes websites evaluation promises strategic benefits as leadership with the competition and customer retention. As the above-mentioned the aim of this exploratory study is to identify whether Lithuanian as medical, health and wellness destination branding is different from other Baltic States – Latvia and Estonia. To achieve this aim we need to find the answers for the following questions: Do NTOs websites of these three countries differ in destination branding and what is a specific is of Lithuanian NTO website? What are differences in destination branding on websites of Lithuanian and Latvian, Estonian resorts' City Councils? Are the Lithuanian destinations branding dimensions unique to the destination in order to distinguish them from others?

Few steps were followed in this research. First, based on meta-analysis methodology of the outcomes of various studies related of destinations as well as the niche tourism web sites' evaluation (Florek et al., 2006; Fernández-Cavia et al., 2014; Balakrishnan, 2009; Pike et al., 2010; Hakala et al., 2013; Tang-Taye et al., 2013; Sirisuthikul, 2006; Cormany, Baloglu, 2011; Smith, Puczkó, 2014; Law et al., 2010), the dimensions/factors which will be used for inquired Lithuanian, Latvian and Estonian destinations web sites evaluation were extracted. The synthesis of these dimensions is presented on Figure 1.

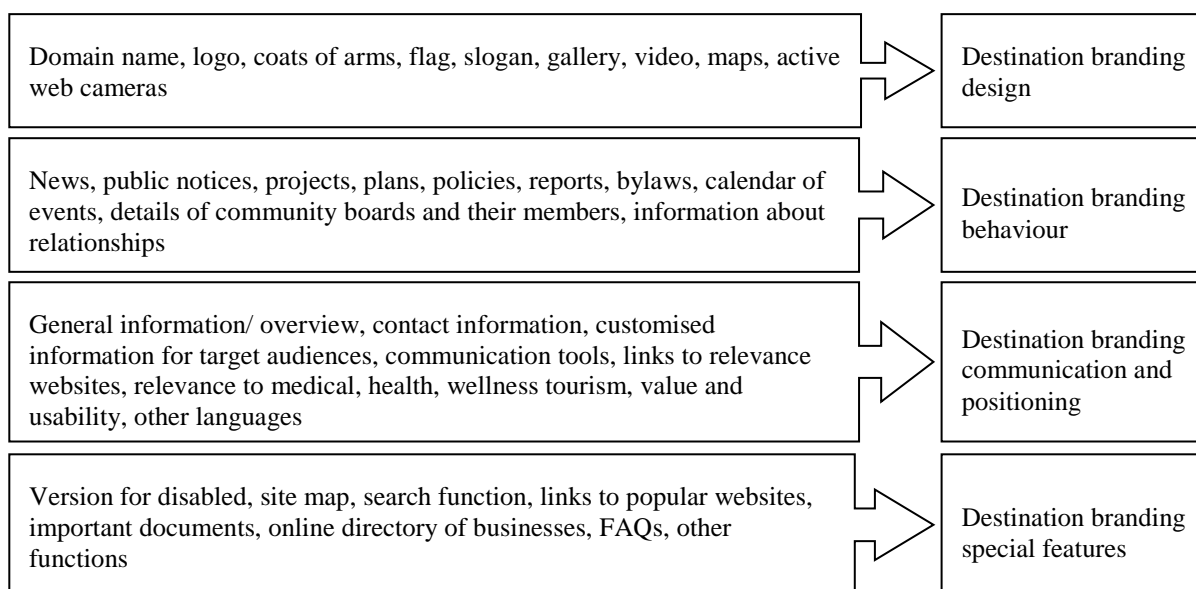


Figure 1. Dimensions of destination branding of three Baltic States and their resorts included in the research.

Secondly, the websites of NTO as gateway to a country/region were identified (Table 1). After that the Lithuanian, Latvian and Estonian resorts websites were chosen. For information retrieval by Google's search engine keywords in English were only used. The NTO and resorts cities Councils perform the functions of destination marketing organizations and are responsible for brand positioning. Consequently their websites were analysed as more credible sources of information than commercial sites of tourism operators.

Table 1. Websites of the Baltic States included in the research.

Country	The World Wide Web
Lithuania	http://www.lithuania.travel/
Latvia	http://www.latvia.travel/
Estonia	http://www.visitestonia.com/

Despite the focus of this research on medical, health and wellness tourism all resorts in Lithuania, Latvia and Estonia were included in study. The list of three Baltic States resorts' cities Councils' and their websites addresses is given in Table 2.

Table 2. Websites of resorts' Cities Council's included in the research.

Lithuania	Latvia	Estonia
Druskininkai http://www.druskininkai.lt/	Jurmala http://www.jurmala.lv/	Haapsalu http://haapsalu.ee/
Birštonas http://www.birstonas.lt/	Saulkrasti http://www.saulkrasti.lv/	Narva-Joesuu http://www.narvajoesuu.ee/
Trakai http://www.trakai.lt/	Sigulda http://www.sigulda.lv/	Otepää http://www.otepaa.ee/
Ignalina http://www.ignalina.lt/	Salacgriva http://www.salacgriva.lv/	Parnu http://www.parnu.ee/
Zarasai http://www.zarasai.lt/		
Anykščiai http://www.anyksciai.lt/		
Neringa http://www.neringa.lt/		
Palanga http://www.palanga.lt/		

Websites are a dynamic means of communicating with audiences; its content could change during and after our research. Thus the outcomes of Lithuanian, Latvian and Estonian NTO and resorts websites reflect the situation on June–July 2014.

For analysing the websites of the Baltic States NTO and the resorts cities Councils the English version was used. Not all information in English was provided on resorts Cities Councils' websites, a few of them even have not had the English version at all, or just the short version.

The coding of the websites' text upon the destination branding dimensions was done by both authors of the paper, separately. Separate coding enabled to check the correspondence among the same information, text, dimensions, to ensure the validity of the research. Destination branding dimensions – design, behaviour, communication and positioning as well as special features – were firstly identified, the items of these dimensions (textual or visual, or both) were examined afterward. A few of items (i.e. bylaws, details of community boards and their members) are excluded from examined NTO websites as unnecessary.

The frequency of presence or absence dimension in the research of City Council websites is calculated upon all possible cases (in Lithuania – 8 resorts, Latvia and Estonia – 4 resorts). The ranking and frequency of brand design, behaviour, communication and special features was calculated among each country's resorts separately in order to indicate (if it is as any) the specifics of Lithuanian destination branding in medical, health, and wellness tourism destinations.

The results were presented in two parts. In first part the outcomes of content analysis of three Baltic States national official tourism websites are presented; in second part the results of comparison of Baltic States resorts' cities Councils websites are layered.

5 Findings of the research

5.1 Results of exploration of NTOs websites

The domain name directly influences the accessibility of website for information seekers. In case of finding a country as destination, name of a country is generally used. The other keywords such as *travel*, *tourism*, *visit*, etc. can be employed too. As well as the range identified by search engine results is very important.

Seeking the countries upon the keyword of the country's name Lithuanian NTO website is given in the 6th position while Latvian and Estonian – in the 4th (Table 3).






Table 3. The range of results in Google search engine upon the keyword of the country.

Country	Keywords used for Google's search engine		
	Name of country	Travel + Name of country	Tourism + Name of country
Lithuania	6	2	3
Latvia	4	1	1
Estonia	4	1	1

The results of the search show that Lithuanian position in the results supplied by Google is in the worst position comparing to Latvian and Estonian, but still is in the first page of results in Google.

Domain name of NTO website of Lithuania is similar to Latvian, but differs from Estonian. Brand design of the countries differs by its content, logo, and keywords used (Table 4). The websites of Lithuanian and Latvian NTOs have elements of destination brand – logo, slogan. On Estonian NTO website the coat of arm is not provided. It should be noticed that Lithuanian slogan relates to the promoting a country as a destination that provides amber in its routes, resources, medical, health and wellness packages. The gallery of pictures that can help tourists to discover the destination is not provided in NTO websites. However, Estonian website provides links to “Images” in the bottom line, where a few of pictures explained in Estonian language could be found.

Table 4. The logos, coats of arms, and slogans used in the NTO websites.

Country	Logo	Coat of arm	Slogan
Lithuania			<i>Amber road</i>
Latvia			<i>Getting to know Latvia and Latvians</i>
Estonia		Not provided	<i>Estonia positively surprising</i>

There are many videos in Lithuanian and Estonian NTO websites, Latvian in many cases are “under construction”. The first video on the homepage of Lithuanian NTO website provides information about spa bad, swimming pools, major wellness and spa hotels in the country. A few video supplied information in Lithuania, as post-Soviet country tourism destination, as many tourists can visit the country because of nostalgia for the Soviet period; as destination which does not depend on seasonality. The content of the videos of three Baltic States is rather similar, representing medical, health and wellness tourism possibilities, and attractions such as theme parks (more in Latvia and Lithuania than in Estonia).

Maps provided on Lithuanian NTO website are both interactive and static. There is a separate selection in the menu of the website as “Routes”, where an information seeker can find such selection capabilities as: Route of three Baltic States capitals, Vilnius route, Kaunas and its premises, Klaipėda and sea resort route, Mineral water resort route, Lake Area route, Amber route, etc. Other items in the menu, such as “About the country”, “Attractions”, “Events”, “Links”, “Publications”, “Contacts”, and “Amber road” do not include any maps. The virtual map is provided in majority of items’ selection in the menu of Latvian NTO website: “About Latvia”, “Where to go and what to see”, “Destinations”, and “Travel and transport” (except the menu item “Accommodation”). The same opportunities to use active travel map on Estonian NTO website are provided. Each item (“About Estonia”, “Things to see and do”, “Destinations”, “Accommodation”, “Travel and transportation”) in the menu provides the virtual map, except the “Travel planner” what itself provides interactive travel planning tool.

NTO websites of Lithuania, Latvia and Estonia are not equipped by active web cameras. The results of examination of brand design on Lithuanian, Latvian and Estonian NTO websites are presented below (Table 5).

Table 5. Destination brand design elements in the NTO websites.

Brand design elements	Lithuania	Latvia	Estonia
Domain name	"Name of country" + "travel"	"Name of country" + "travel"	"Visit" + "Name of country"
Logo	+	+	+
Coats of arms	+	+	-
Flag	+	+	+
Slogan	+	+	+
Pictures' gallery	Not identified as separate menu item	Not identified as separate menu item	Not identified as separate menu item
Video	Related to thematic of destination or route	Related to thematic of destination or attractions	Related to culture, traditions of country
Maps	Interactive and static maps as separate menu item, as well related to route	Interactive maps in any page of website, except one. Static for download is provided	Interactive maps in any page of website, except one, which is interactive travel planner
Web cameras	-	-	-

Items of destination branding behaviour dimensions contain the customised information, i.e. news, for target audiences differs in tourism national websites. Lithuanian NTO website provides a part of each page, not only homepage with news in Lithuania, as news from Tourism Association, Family Holiday Association, news from Lithuanian in the UK (separate news for Lithuanian-emigrants), makes access to networks, such as Facebook, Twitter as well as other social media, i.e. *Youtube.com*, Blogs. Also a separate item in the menu as "Publications" is provided. Latvian NTO website provides "Related news" on any page of the website, for example, "Destination", "About Latvia", etc. Estonian NTO website offers "Press" with news related to tourism.

Content of public notices, plans relate to news, as well as announcement about events in all three websites. Lithuanian, Latvian and Estonian NTO websites give the information about participating of these countries in tourism development projects founded by the European Union.

Reports in Lithuanian NTO website are containing rather differentiated information on tourism attractions, kinds of tourism such as "Travel round cultural cities", "Active tourism", "Taste it! Love it!" (Restaurants report)", "Lithuanian meetings guide", "Lithuanian report on year of EU presidency", etc. Reports on Latvian NTO website also relate to differentiate information, target audiences: "Top tourism destinations", "Day trips around Riga" (Capital of Latvia), "Health, wellbeing, harmony", "European Culture capital Riga-2014", "Recreation for families", etc. Reports on Estonian NTO website grouped upon language, upon subject, upon the target of travel ("Cultural", "Conference tourism", "Nature holiday", "Family holiday", "Wellness holiday").

The calendar of events on Lithuanian NTO website has its own button in the menu and is used as interactive tool, choosing any day and finding information about events, links to events (Tourism information centre, Maps, Websites, etc.), pictures' gallery. This interactive tool gives a possibility to filter events according to type and locality. The same as news, information about events in Latvian website is provided related to the page in website, for example, in the page of "Destinations" an announcement of Sings festival. On Estonian NTO website there is difficult to find information about events, as it is in the fourth level of the page starting from homepage (Press, Press room, RSS).

Relationship is provided in the Lithuanian NTO website with geographically neighbouring countries, information about NATO, EU, etc. Latvian NTO website provides the information about membership in EU, Estonian – geographical neighbours and membership of EU. Summary of destination branding behaviour is done in table below (Table 6).

Table 6. Branding behaviour elements found on the NTO websites.

Branding behaviour elements	Lithuania	Latvia	Estonia
News	Special information block in each of site, plus special site "Publications", news in social networks	Classified news in any site of website, as well as special News item in menu	News provided as special site in website
Public notes	Related to news item	Related to news item	Related to news item

Branding behaviour elements	Lithuania	Latvia	Estonia
Plans	Related to news item	Related to news item	Related to news item
Projects	Common with EU	Common with EU	Common with EU
Reports	Differentiated reports concerned different types of tourism and attractions	Differentiated reports, differentiated target audiences	Reports upon languages, subjects and types of tourism
Events calendar	Special menu item, interactive tool, related information provided. Special block of major events announcement in each page	Information about events is provided in each page, relating to the category of page. No separate menu item for events	Special information on events in 4th level of page, difficult to find. Information rather brief, no links attached
Relationship	EU, NATO, geographical neighbours	EU	EU, geographical neighbours

General information is provided by all three examined websites; still its layout and content differ. Lithuanian NTO website offers general information about the country, holidays, local time, transport, emergency phones, communication as well as the information about the largest cities. Users can “sign in” and get newsletter about tourism activities. Latvian NTO website consists of “Latvian in brief”, population and territory; actually this information does not differ a lot from Lithuanian and Estonian ones. Estonian NTO website gives more information about the country; the “dry facts” are complemented by information “What people are talking about Estonia”, “What is special about Estonia”. The content of this website demonstrates the country intentions to show Estonian oneness starting from the first page.

Contact information on Lithuanian NTO website is provided on the special page with the menu button “Contacts”. Contact data include the name of a related institution (i. e., tourism information centres, resorts’ tourism information centres, national parks, etc.), address line, opening hours, phone, fax number, e-mail, and hyperlink to the website. Contact of State Department of Tourism is provided. On Latvian NTO website there is no selection opportunity as *contacts*. However, contact information line is shaped in the bottom of each page where anybody can find direct link to Latvian tourism development agency and secondary links to the largest cities, regions (Kurzeme, Vidzeme, Zemgale, and Latgale Tourism Association). Contact line on the Estonian NTO website links directly to Estonian Tourist Board. Quick links contacts line is supplied on the bottom of the pages with links to the capital and two resorts of Estonia.

Customised information on the homepage of Lithuanian NTO website is targeted at specific information seekers: “Business”, “Active”, “Cultural”, “Health”, and “City breaks tourism”. Besides that, there are other selection opportunities for target audiences in the menu, as “Attractions” with interactive tool-filter for any interest (water entertainment, spa, religion, theatre, music, beauty services) or possibility to mark all of them. The Amber Route defines different target audiences, as tourists for the amber road, water entertainment, seashore, etc. They are less than on Lithuanian NTO website choices for tourists on the homepage of Latvian NTO website: adventure parks, fishing and cultural tourism. The second level page “Where to get and what to see” offers wide range of services and activities: “Spa and wellness”, “Medical”, “Business”, “Green tourism”, “Leisure”, etc. The information on “Top destinations” is also provided. Two possibilities on the Estonian NTO website are for customized information: “Things to see and do”; and “Destinations” choices on menu. There are many customized information starting from “Wellness and spa”, “Nature tourism”, “Active tourism”, “City break”. Actually it is the same as on Lithuanian NTO website, but in the homepage.

Communication through social networks, online forums is provided by Lithuanian NTO website, but there is not the online form for asking/suggesting any information. Latvian NTO website provides the interactive online asking form with asking the user to make web better, proposals, content, photo, etc. – sending message online. This interactive tool is provided from any page on the website and it is easy to find “Feedback”. The same online tool is used for communicating on Estonian NTO website.

Specific information and links to relevance websites is provided by Lithuanian NTO website on each page at the bottom line, as well as in the information about “Tours operators”, “Contacts”, etc. Latvian NTO website provides the link in the bottom line of each page, in the second level page of “Accommodation”, “Destinations”, “Travel and transport”. Estonian NTO website gives quick links on the home and the second level pages.

The items important for the medical, health and wellness tourists communicated on the examined websites differ. The homepage of Lithuanian NTO is linked to the health tourism, which provides information about water parks, sanatoriums, resorts, rehabilitation institutions. As mentioned above, the video is also related mainly to spa, sanatoriums in Lithuania. The second level page provides the selection among many attractions, where 4 out of 21 attractions could be defined as medical, health or wellness activities (“Beauty services”, “Nature”, “Spa, sanatoriums”, “Water entertainment”); 2 routes out of 9 also are related to medical, health and wellness tourism (“Mineral water resort route”,

“Klaipeda and sea resort route”). Differently than on Lithuanian NTO website only the second Latvian NTO website page “Where to go” directs to the medical, health and wellness activities: 2 out of 12 activities are directly related (“Spa and wellness”, “Medical tourism”). Also the “Accommodation” page provides customized information for spa tourists providing “Spa accommodation”. Links to spa holidays are provided already on the homepage of Estonian NTO. The second level page “Things to see” provides 1 out of 11 activities related to medical, health and wellness (“Wellness and spa”). The heading *Accommodation* provides 1 type of the accommodation “Spa hotels” out of 9 types possible. In summary, the destination branding communication and positioning elements in the Baltic States NTOs websites are provided by Table 7.

Table 7. Destination branding communication and positioning elements in the NTO websites.

Branding communication and positioning elements	Lithuania	Latvia	Estonia
General information/ overview	Common facts, more details on large cities, newsletter for users	Common facts, more details on cultural-historical divisions	General facts, “life stories”, targeting, specializing the tourism destination
Contact information	Specific menu item with categorized contact details	Bottom information line with contacts to tourism authorities and tourism departments	Specific menu item only for contacts with tourism association. Bottom contact line to large cities
Customised information for target audiences	Homepage with customized information, second level page with target upon interest. No destinations included	Narrow specialization of tourism located on the homepage, wide in second level page. Destinations excluded	Wide choice of target information in specific page. Destinations excluded
Communication tools	Facebook, online forums	Facebook, Twitter, online communicating forms/ tools	Facebook, online communicating forms/ tools
Links to relevance websites	Home page, second level page, separate page	Home page, second level page, separate page	Home page, second level page, separate page
Relevance to medical, health, wellness tourism	Homepage: customizing the health tourists. 2 nd level page: medical, health, wellness.	Homepage: no information customizing the health tourists. 2 nd level page: medical, health, wellness.	Homepage: customizing the wellness tourists. 2 nd level page: medical, health, wellness.

Information accessibility for tourists on foreign languages is one of the most important factors for destination branding communication and positioning. In this point of view Estonian NTOs website is the most attractive (Table 8).

Table 8. Foreign languages used for destination branding communication and positioning on the NTO websites.

Country	EN	RU	DE	PL	NO	IT	EE	FR	SE	FI	LT	ES	LV	CN	KR/KP	Total
Lithuania	+	+	+	+	+	+	+	+	+	+						10
Latvia	+	+								+	+					4
Estonia	+	+	+	+	+	+		+	+	+		+	+	+	+	13

Site map, search function, search engine, and filter for information as special destination branding features are used by all three countries NTOs websites. Lithuanian NTO website provides separate menu item as “Links” to popular websites (i.e. “Hotels”, “Events”, etc.).

Version for the disabled is provided by Lithuanian and Estonian NTOs websites. Interactive tool with current temperature and local time is offered by Lithuanian NTO website. Estonian NTO website for weather forecast provides links to *tripadvisor.com*. The Travel Planner Interactive Tool is provided on the separate page of Estonian tourism website. Programs for downloading for smart phones are provided by Latvian NTO website. Lithuanian NTO website has a special online forum organized for Lithuanian emigrants to the UK on Facebook, as majority of emigrants from Lithuania live in the UK now.

Lithuanian NTO website users can use the print function on the homepage. Also brochures in the “Publication” menu could be obtained in print version. Downloading and printing the information guides on Latvian NTO website is allowed. Estonian NTO website provides the possibility to print or save as pdf file each page.

5.2 Findings of resorts' websites exploration

The resorts Cities Councils' websites identified by Google's search engine and included in this study are presented in Table 9.

Table 9. The range of results in Google search engine upon the keyword of the resort city.

Lithuania		Latvia		Estonia	
Resort name	Range	Resort name	Range	Resort name	Range
Druskininkai	4	Jurmala	6	Haapsalu	6
Birštonas	3	Saulkrasti	4	Narva-Joesuu	2
Trakai	1	Sigulda	50	Otepää	2
Ignalina	1	Salacgriva	4	Pernu	15
Zarasai	1				
Anykščiai	1				
Neringa	1				
Palanga	1				

The larger and more famous resort city, the larger likelihood it appears in the further than the first position. Such websites as *booking.com*, *tripadvisor.com*, website of tour operators and hotels are found by Google's search engine in the higher positions. The authors of the research have made attempts in order to find resort name with the second keyword travel, as well as with *tourism*, for example, "Travel" + "Druskininkai". Unfortunately, they were not found in the first ten pages of the results in the Google's search engine. It means that the domain of a resort city (non-resort City Council website) is not found easily by website readers/users.

The domain names of Lithuanian, Latvian and Estonian resorts' cities Councils websites are constructed of the *name of the resort* and *abbreviation of the country* (accordingly "lt", "lv", "ee").

Brand design elements, used in the resorts Cities Councils websites, are presented in the tables below (Tables 10, 11, and 12). The resorts on their websites usually do not use logo and country flags. In many cases the logo is changed by the coat of arm. Lithuanian resorts do not provide flags on their official websites. The only resort in Latvia (Salacgriva) and two in Estonia (Otepää and Pernu) do that.

Table 10. Lithuanian, Latvian and Estonian resorts' logos.



Lithuania		Latvia		Estonia	
Druskininkai		Jurmala		Haapsalu	
Birštonas		Saulkrasti	-	Narva-Joesuu	-
Trakai	-	Sigulda		Otepää	-
Ignalina	-	Salacgriva		Pernu	
Zarasai	-				
Anykščiai	-				
Neringa					
Palanga	-				

Table 11. Lithuanian, Latvian and Estonian resorts' coats of arms.

Lithuania		Latvia		Estonia	
Resort name	Coat of arms	Resort name	Coat of arms	Resort name	Coat of arms
Druskininkai		Jurmala	-	Haapsalu	-
Birštonas		Saulkrasti		Narva-Joesuu	
Trakai		Sigulda		Otepää	
Ignalina		Salacgriva		Pernu	
Zarasai					
Anykščiai					
Neringa					
Palanga					

A few of slogans are translated to English if the websites of the resorts' Cities Councils provide the only version in their native language (Lithuanian, Latvian). The Estonian resorts' Cities Councils websites provided (whose do that) a slogan in Estonian and English.

Table 12. Lithuanian, Latvian and Estonian resorts' slogans.

Lithuania		Latvia		Estonia	
Resort name	Slogan	Resort name	Slogan	Resort name	Slogan
Druskininkai	Sveikatos šaltinių kurortas (Resort of health resources)	Jurmala	Pilsēta uz viļņa! (Town on the wave)	Haapsalu	-
Birštonas	Tavo istorijos harmonija (Harmony of your history)	Saulkrasti	-	Narva-Joesuu	-

Lithuania		Latvia		Estonia	
Resort name	Slogan	Resort name	Slogan	Resort name	Slogan
Trakai	-	Sigulda	Sigulda aizrauj! (Siguda fascinates)	Otepää	The Jewel of Estonian Landscape
Ignalina	-	Salacgriva	-	Pernu	Try it yourself
Zarasai	-				
Anykščiai	-				
Neringa	Legenda, kuri įkvėpia (Legend which inspires)				
Palanga	-				

The analysis of Lithuanian resorts' Cities Councils websites shows that the maps of the city are the most popular (7 out of 8 resorts use it) brand design elements. The gallery of pictures are provided more seldom. One of the resorts in Lithuania has got its own TV. That is why a lot of videos are used as design elements on their website.

The summary of Lithuanian, Latvian and Estonian resorts' destination brand design elements is provided below (Table 13). Latvian resorts' Cities Councils websites use the galleries of pictures, video, mostly of them interactive maps. Palanga, the Lithuanian resort, and Jurmala, the Latvian resort, provide active camera from the beach. In case of destination branding as some additional (or supplementary) element are used the national flag, coat of arm, as well as maps. The maps are used by all Estonian resorts' websites. Video and active cameras are not popular, except Otepää resort that has the active video camera with transmission of views in a city.

Table 13. Ranking and frequency (%) of destination brand design elements used in the resorts websites.

Design element	Lithuania		Latvia		Estonia	
	Rank	%	Rank	%	Rank	%
Logo	5	37.5	2	75	3	50
Coats of arms	1	100	2	75	2	75
Flag	7	0	4	25	3	50
Slogan	5	37.5	3	50	3	50
Pictures' gallery	3	62.5	1	100	2	75
Video	4	50	1	100	4	25
Maps	2	87.5	2	75	1	100
Active cameras	6	25	4	25	4	25

Table 14 provides the information about destination branding behaviour elements used by resorts' Cities Councils websites. Lithuanian resorts' Cities Councils websites use majority of branding behaviour elements. 6 of 8 resorts (it is 75 percent of them) used reports and mentioned about relation with other cities Councils, national tourism association, etc. Latvian resorts' websites use rarely information about relation in what municipality is engaged (only two of them mentioned this fact). The events' calendar usually is interactive tool in Lithuanian, Latvian and Estonian resorts websites. That is important information's tool for potential domestic or foreign tourists and links to rather broad information on coming events.

Table 14. Ranking and frequency (%) of destination branding behaviour elements used on the resorts websites.

Branding behaviour element	Lithuania		Latvia		Estonia	
	Rank	%	Rank	%	Rank	%
News	1	100	1	100	1	100
Public notes	1	100	1	100	1	100
Plans	1	100	1	100	4	25
Projects	1	100	1	100	3	50
Reports	2	75	2	75	3	50

Branding behaviour element	Lithuania		Latvia		Estonia	
	Rank	%	Rank	%	Rank	%
Bylaws	1	100	2	75	2	75
Events calendar	1	100	1	100	1	100
Details of community board and their members	1	100	1	100	1	100
Relation	2	75	3	50	3	50

The branding communication and positioning elements in Lithuanian, Latvian, and Estonian resorts Cities Council's websites actually do not differ (Table 15).

Table 15. Ranking and frequency (%) of destination branding communication and positioning elements used on the resorts websites

Branding communication and positioning elements	Lithuania		Latvia		Estonia	
	Rank	%	Rank	%	Rank	%
General information/ overview	1	100	1	100	1	100
Contact information	1	100	1	100	1	100
Customised information	1	100	1	100	1	100
Communication tools	1	100	1	100	2	75
Links to relevance websites	1	100	1	100	1	100
Relevance to medical, health, wellness tourism	2	75	1	100	1	100
Foreign languages	3	75	2	75	1	100

General information is provided on each of the analysed website. Only Lithuanian resort Neringa City Council website has the link with Facebook and other social networks. Two of four Estonian resorts' Cities Councils' websites provide such communication form. Customized information of resorts website relates to information for the citizen, tourists, businesses, etc. Two out of eight Lithuanian resorts (Anykščiai, Ignalina) Cities Councils' websites do not focus on the items related to medical, health and wellness tourism.

Special features on resorts websites are also used (Table 16).

Table 16. Ranking and frequency (%) of destination branding special features used on the resorts websites.

Branding special features	Lithuania		Latvia		Estonia	
	Rank	%	Rank	%	Rank	%
Version for the disabled	1	100	2	75	5	0
Site map	2	87.5	2	75	3	50
Search function	1	100	1	100	2	75
Links to popular websites	2	87.5	1	100	2	75
Important documents	1	100	3	50	5	0
Online directory of businesses	5	12.5	4	0	4	25
FAQs	4	62.5	4	0	4	25
Print/download version	4	62.5	3	50	1	100

Some notes about using the languages could be noticed: two resorts (Druskininkai and Neringa) Cities Councils' websites provide the information only on the Lithuanian language. These two resorts in Lithuania are visited by many foreigners whose opinion could be used as promotion in WOM for other potential visitors. Even if these resorts have active tourism information centres, this failing should be eliminated. Such languages as English and Russian are used on many of Lithuanian, Latvian, and Estonian resorts websites. The only website in Lithuania (Trakai) can provide four languages except native: English, Russian, German, and Polish. Jurmala, as internationally acknowledged resort, also uses the German language, except Latvia, English and Russian. Haapsalu in Estonia uses two more: Finish and Swedish.

Concluding remarks

Websites can have possibility to play an important role not only as *passive transmission* of information, such as general information about country, resort, destination, and unique branding identity, but *interactive communication* with users, citizens, tourists, individuals or businesses' representatives, community of a country or any foreigner who has never been in the country or resort till the moment. The customized information for the target audience allows getting feedback from potential tourists, who find or cannot find relevant information for their interest. Calendar of events, interactive tools in finding them according wishes and needs, maps, routes, virtual sightseeing – all these tools on the World Wide Web enable to shape the destination branding in entire destination marketing. Destination branding elements through the web could be changed very quickly into response of users, tourists, feedback, etc. Website can act as tool for communicating very different auditorium, shareholders, not only because of send message, but also because user, information seeker can act its role in contributing to the web.

Answering to the research questions the authors of this paper should stress that Lithuanian destination branding is similar to Latvian and Estonian. Still feedback from websites users should be improved, using active online forums, questionnaires, etc. More clear keywords on the website such as not only *health tourism* but also *medical*, *wellness*, *spa* could be used in order to attract medical, health and wellness foreign tourists. Lithuanian resorts' Cities Councils should include the pictures' galleries and video on the homepage of their websites, as well as active cameras could be used. Slogans should be used by every resort in order to underline the essence of the resort; they should be translated to English, German, Polish and other languages as they pretend to be internationally acknowledged. As communication in foreign languages is very urgent for destination branding, necessity to provide NTO, resorts' City Councils websites in other than Lithuanian – is crucial. Behaviour elements, as well as destination branding communication and positioning elements are similar to the Latvian and Estonian practice. However, the same direction for improvement as well as for national tourism website could be formulated: Lithuanian resorts' City Councils website should use more clearly identified keywords for medical, health and wellness tourism, their value for the tourists.

Lithuania as destination having eight resorts has more opportunities to attract medical, health and wellness tourists from neighbouring, the EU or even other foreign countries comparing to Latvia and Estonia. It is simply essential that resorts would be more specialized and, at the same time, would cooperate together. In addition, Lithuanian NTO and resorts' City Councils trying to specialize, for example, in medical tourism (as well as health, wellness tourism), should supply relevant information about potential treatment services and contacts on their websites. Respectively health and wellness resorts should follow this strategy in the destination branding. The websites should provide clear information that Lithuanian medical, health and wellness resorts, their tourism enterprises cooperate in order to provide the higher value for their tourists.

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Risk-conscious value creation

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The concepts of value creation and risk management are commonly used by management researchers, business consultants and firms. However, the interrelationship of these concepts is rarely considered in academic research. This paper approaches value creation from the perspective of risk management. The main research question is “How the concepts of value creation and risk management interrelate?” In addition, advantages and disadvantages resulting in tying these concepts together are discussed. The results show that even though risk is acknowledged as an important variable in value creation, the current discussion does not proceed from risk identification further to risk analysis and management. The paper concludes that tying up the concepts could bring some benefits as well as new opportunities to consider risk-conscious value creation.

1 Introduction

Delivering superior value has been a key theme in marketing and management research for some time, as it is widely acknowledged to lead to higher customer satisfaction, greater level of customer loyalty, long-term industrial relationships and overall firm success (Ulaga; Chacour, 2001). It also appears that there is a need for a wide scope of research to refine the existing elements of value creation and add new ones in the near future and beyond (Lindgreen et al., 2012). Several scholars argue that although widely discussed in the current literature, value creation is still a complex and multifaceted concept in need of clarification (see, for example, Saarijärvi et al., 2013; Bowman; Ambrosini, 2010; Lepak et al., 2007). One such element that could be further refined and would benefit from clarification is risk and risk management in value creation.

Risk management has deep roots in late 1900s' product-based business logics. The need to identify, analyse and mitigate risks in different circumstances has evolved from avoiding accidental losses (e.g. McCahill, 1971). Another discipline has been financial risk management originated from Markowitz's (1952) portfolio theory. Risk management refers either to a formal or an informal process of planning, organizing, leading, and controlling the activities of an organisation in order to minimize the effects of risk (e.g. Zimolog; Elge, 2006). A risk can arise wherever a potential source of damage or loss (i.e. a hazard) to a target exists. Nowadays, the subject of risk plays a relevant role in design, development, operation and management of processes, systems and structures in all industrial areas (Avent; Zio, 2011).

Although the procedures for risk management are well established in various industrial sectors and research disciplines, they have reached service research and value creation studies only in limited manner. Some scholars have analysed the relationship between risk and value in business-to-consumer (b2c) context covering industries such as retailing (Sweeney et al., 1999), e-commerce and -services (Chen; Dubinsky, 2003; Kleijnen et al., 2007; Shamdasani et al., 2008), mobile phones (Snoj et al., 2004) and accommodation (Chang; Hsiao, 2008; Lei et al., 2008). These studies approach the customer value through the concept of perceived risk, and give empirical evidence to the likely assumption that risks are included in the value perceptions of the customers. Quite surprisingly only one reported study examining the relationship of risk and value in business-to-business (b2b) context could be identified. The study of Faroughian et al. (2012) explores the role of risks in value perceptions within the e-banking industry. In line with findings of the b2c domain, they confirmed the view that risk is a significant determinant of value also in b2b context.

In this paper, we go one step further and approach value creation from the perspective of risk management. That is, in addition to discussing how the risks in value creation could be identified, we also consider how risks could be managed in the context of value creation. Thus, the purpose of the paper is to identify and discuss the similarities and contradictions between the processes of value creation and risk management. The main research questions to consider is “How the concepts of value creation and risk management interrelate?” In addition, advantages and/or disadvantages resulting in tying these concepts together are discussed.

In this paper, we first describe our literature review methodology. Then, we take a closer look at how risks are considered in the current value literature. This is followed by an introduction to risk management. As a result of the literature analysis, the similarities as well as the differences of value creation and risk management approaches are illustrated. The paper concludes with a discussion on how a more risk-conscious approach to value creation could benefit both parties – the firm and the customer – and how the current risk management practices are applicable for this purpose. Finally, we draw conclusions and point out some research gaps and opportunities.

The interest towards integrated value creation and risk management has arisen from the authors' research background from different disciplines. We have been involved in several research projects concerning value creation in service business (e.g. Hämäläinen et al., 2014; Murtonen, 2013; Rajala et al., 2013; Jähi et al., 2013; Murtonen et al., 2012; Jähi, 2011) and in projects concerning risk management in various business sectors (e.g. Leppälä et al., 2012; Rääkkönen et al., 2012; Tukiainen et al., 2010; Lanne, 2008; Lanne; Sarsama, 2008; Ojanen et al., 2008; Lanne, 2007). We have also conducted and facilitated risk assessment and management development projects both with private and

public sector customers. Following the processes of risk management and value creation closely in these real-life cases has raised questions of their similarities and contradictions, and on the other hand, awoken our interest to look closer at the overlaps between these two approaches.

2 Methodology

The methodology of the paper is twofold: First, we seek to review the relevant literature on value creation and risk management. Thus, we attempt to produce a useful understanding of the key aspects of the two approaches and their relationship. Second, we conduct a comparison of the key aspects to identify similarities and differences between value creation and risk management.

A literature review is usually regarded as an essential step in understanding and structuring a research field (Easterby-Smith et al., 2002) as well as understanding the conceptual content of it (Meredith, 1993). As both value creation and risk management are wide-ranging approaches, it is not feasible to present complete reviews of them in this paper. Instead, we give a brief overview of some of the extant literature. To conduct our analysis, we selected publications (mainly journal articles) that were either commonly referenced in the more recent literature or they had high relevance from the viewpoint of the paper. Moreover, we use the literature review as a platform to comparison and discussion. Thus, we aim at identifying relevant key aspects of the literature instead of summarizing and giving a full account of the existing research.

To set limits to the review, individual perceptions of risk and value are excluded from this paper. Rather, the focus is more on value creation and risk management processes within organisations and inter-organisational relationships. With regard to value creation, this turns the focus to value creation in business-to-business setting. In relation to risk management, we put the emphasis on enterprise risk management.

3 Value creation and risks

At a fundamental level, creating value is the basis of all business and critical to all firms. Value creation refers to a process or activities that provide more novel and appropriate benefits than target users (internal or external customers of the organisation) currently possess, and that they are willing to pay for (Lepak et al., 2007). Each firm has several processes and activities (Bowman; Ambrosini, 2007; Wynstra et al., 2006; Grönroos; Voima, 2012), through which they create value in many different ways to shareholders, customers and other stakeholders (Khalifa, 2004). Nevertheless, customer value is regarded as the source of all other values (Grönroos, 2000 ref. Khalifa) and predominates in the current literature.

Drawing from the transaction cost theory, value is often considered as a ratio between expected or perceived benefits and sacrifices (Khalifa, 2004). In this view, the expected benefits comprise various positive consequences and desired outcomes of the targeted action, such as improvement of performance or experience, increased profit or higher customer satisfaction; while the sacrifices refer to all negative outcomes and costs that arise from the targeted action. These are, for example, loss of time and money, increased effort and psychosocial stress, reduced efficiency and other negative consequences. There are other voices in management research, however, who try to reach beyond the prevalent cost-benefit form of value adding more dimensions to it. They emphasise, for example, several dimensions of relationship value (Biggeman; Buttle, 2012), value as the user experience (Helkkula et al., 2012), or more context-specific and perception-focused approach (Sánchez-Fernández; Iniesta-Bonillo, 2007).

Several scholars argue that although widely discussed in current literature, value creation is still a complex and multifaceted concept in need of clarification (see, for example, Saarijärvi et al., 2013; Bowman; Ambrosini, 2010; Lepak et al., 2007). This can be seen, for example, in the most oft-cited sources that give several definitions to value (Zeithaml, 1988). In addition, there are some biases in the value studies. For example, customer value studies have been far more focused on benefits and usually pay much less attention to the sacrifice aspects, like time costs, risks and the destruction of value (Graf; Maas, 2008). General assumption in most value studies is that all activities that aim at creating value within a company or in interactions between companies end up at with expected results, and value is created as a result. In a value creation process, value can be both increased and decreased, however, and the net amount of created value can also be negative (Grönroos, 2004). In addition, value creation is not always symmetrical and balanced, and positive added value to one party may result in negative added value for the other (Rosqvist et al., 2010; Plé; Cáceres, 2010). To balance the currently dominant over-positive view, we will now turn our attention to the element of sacrifice and try to clarify some aspects related to risks attached to value creation from a firm's and a customer's perspective.

From a **firm's perspective**, risk refers to all possible negative outcomes that may result from the value creation activities. One of the risks is that after making significant investments in the value creation process, a firm is not able to capture enough value or not all the value created. This is referred as value slippage (Lepak et al., 2007). Value slippage may also occur if the target user or competitors gain enough knowledge to replicate the value creation process, thus becoming a competitor to a firm (Mustak et al., 2013). Such replication may follow from industrial espionage, key employee resignation, patent expiration or breakthrough technologies. Accordingly, all firm's activities that aim at developing innovative offerings and unique resources and know-how that are difficult to imitate mitigate the risk of value slippage.

Parallel to value creation activities, all firms also have value destroying activities (Bowman; Ambrosini, 2010). Value destruction refers to activities that do not add benefits and decrease sacrifices, but have negative effect on value creation activities instead. Value destruction can also occur in interorganisational relationships. In service science, value co-destruction refers to “an interactional process between service systems that results in a decline in at least one of the systems’ well-being” (Plé; Cáceres, 2010, p. 431). Value co-destruction results from the accidental or intentional failure to use the resources of the service systems in a manner that is expected or appropriate for the firm or for the other parties of the process (Plé; Cáceres, 2010).

Taking the **customer viewpoint**, risk in value creation has been defined as those uncertainties or possible negative consequences that the customer must accept before, during, or after the purchase of a product or a service (Graf; Maas, 2008; Huber et al., 2001). The two most often suggested value related risks being financial and performance risk (e.g. Agarwal; Teas, 2004; Faroughian et al., 2012; Lei, de Ruyter; Wetzels, 2008; Sweeney et al., 1999). When a product or a service is bought, there is always the chance that the purchase will not deliver the expected satisfaction over time, thus risk represents a potential sacrifice (Sweeney et al., 1999). Here, financial risk can be understood as referring to dissatisfaction caused by higher than expected financial burden, and performance risk to lower than expected performance. Additionally, other types of risks, such as social or psychological risks, have also being suggested having a role in value creation (e.g. Snoj et al., 2004).

Despite offering a consistent view that risk is an important variable in value creation, literature seems to give little advice on how to move forward after this initial identification of risk. That is, how to analyse, prioritise and mitigate the risks related to value creation once they are recognized. There are some studies that do offer industry-specific managerial implications how to avoid and mitigate negative experiences that would constitute a risk for the customer. For example, according to Kleijnen et al. (2007) managers should pay attention to alleviating the effort required for consumers to use mobile services by providing simpler service designs and more instructions to consumers. Respectively, providers of e-banking services are advised to emphasize how adherence to security protocols minimise performance and financial risks and help business customers to reduce costs such as the need for additional security software and special training of the staff (Faroughian et al., 2012). However, any generic and systematic efforts to manage risks and uncertainties in the value creation process seem to be lacking from the literature so far.

Next, to further explain the advantages of the risk management activities to the value creation potential, we will take a closer look at the procedures of risk management, which aim at identifying and managing uncertainties in the organisational context.

4 Risk management

All organisations face a wide range of uncertainties that may have an impact on their operations in various different ways. With the help of risk management, organisations are trying to identify, evaluate, control and monitor those uncertainties. In organisational context, risk represents simply “anything that can impact the fulfilment of corporate objectives” (Hopkin, 2012, p.14). This quote implies that risk is something uncertain that may have either positive or negative influence to the strategic objectives of a firm. However, this overall definition might not be suitable in every case, and also more precise definitions exist. For example, in the context of safety management, Aven et al. (2011) characterise risk based on three categories: (a) risk as a concept based on events, consequences and uncertainties; (b) risk as a modelled, quantitative concept; and (c) subjective risk descriptions. In the context of business management, the first category (a) is the most relevant, although the subjectivity of risk perceptions should also be noticed.

In common language, risk typically means the probability or threat of damage, loss, or other negative occurrence caused by vulnerabilities, and also something that can be avoided through preventative action. In the context of safety engineering risk is often considered as the combination of the probability of a hazard-related incident occurring (likelihood of a hazard being realized and initiating an incident) and the severity of harm or damage that could result (e.g. Manuele, 2005, p.36). In the context of managerial decision making, an often-cited definition of risk is “the variance of the probability distribution of outcomes” (March; Shapira, 1987, p. 1404). This view that the effect of risk can be both negative and positive, has become more popular during the last decade even in the international standards (cf. ISO 3100; 2009). This dualistic view of risks draws the attention away from the damage and loss and turns the focus on the objectives that the firm pursuits to achieve.

In the context of internal control and management, discussions on risks are strongly guided by several national and international standards. The international standard ISO 31000 (2009) provides principles, a framework and a process for managing risk. Another well-known and widely-used framework for enterprise risk management (ERM) is proposed by The Committee of Sponsoring Organizations of the Treadway Commission (COSO, 2004). In comparison to the long history of the risk management methodology, the ERM approach is quite new, originating only from the 1990s. ERM links risk management with business strategy and objective-setting, entering the domains of control, accountability and decision making. (Arena et al., 2010) ERM is clearly intertwined with corporate governance and internal control (Liebenberg; Hoyt, 2003; Drew et al., 2006).

ERM can be defined as a process of identifying and analysing risks from an integrated, companywide perspective (Chapman; 2003). The following definition has also been used for separating ERM from traditional risk management: “ERM is the management of operational and financial risks simultaneously in order to maximize the cost-effectiveness of risk management within the constraints of the organisation’s tolerance for risk” (Kleffner et al., 2003, p. 64). The

goal of ERM is to coordinate all risks of the firm, including risks related to corporate governance, auditing, supply chains, IT and human resources (McShane et al., 2011). Especially, the need of integrating ERM and supply chain risk management has recently been pointed out (Scannel et al., 2013).

In the international standards risk management is often described as a process consisting of several phases: event/hazard identification, risk estimation, risk evaluation and decision making (Fig. 1). In risk assessment the most relevant and plausible scenarios should be identified and described with details (e.g. van Dujne et al., 2008). According to the ISO 31000 (2009), risk assessment consists of three steps: 1) risk identification, 2) risk analysis and 3) risk evaluation. In risk identification, risks are defined and risk drivers and categories are identified. After that, in risk analysis, the risks are evaluated by determining potential business consequences and the occurrence likelihood. In risk evaluation, risks are categorised as acceptable and unacceptable risks requiring treatment. Finally, options for treating the unacceptable risks are identified. Typically, when competitive advantage is achievable in business, risk can be accepted, and when avoiding the risk is preferred way to proceed, the consequences and likelihood should be reduced or the risk removed. In addition to avoiding, accepting and reducing risks, sharing and transferring risks are also options for risk treatment selected by management. (ISO 31000, 2009)

ERM framework of COSO (2004) includes similar components as ISO 31000 (2009). However, the framework also highlights risk management philosophy, risk appetite, integrity and ethical values. For example, it has been pointed out that overall objectives of a company should be consistent with firm's risk appetite. It has also been reminded that developing a set of actions should be in line with firm's risk tolerances and risk appetite. (COSO, 2004) Risk appetite and tolerance are typical concepts especially in financial risk management. International standard ISO Guide 73 (2009) defines risk appetite as "amount and type of risk that an organization is prepared to seek, accept or tolerate". Tolerance is the acceptable level of variation around objectives (IIA, 2004) and it is understood as the organisation's or stakeholders' readiness to bear the risk after treatment in order to achieve its overall objectives (Znaniacka; Wieczorek-Kosmala, 2013). In addition, the ERM framework entails information sharing, communicating and monitoring the entirety of ERM in order to improve the process and share knowledge (COSO, 2004).

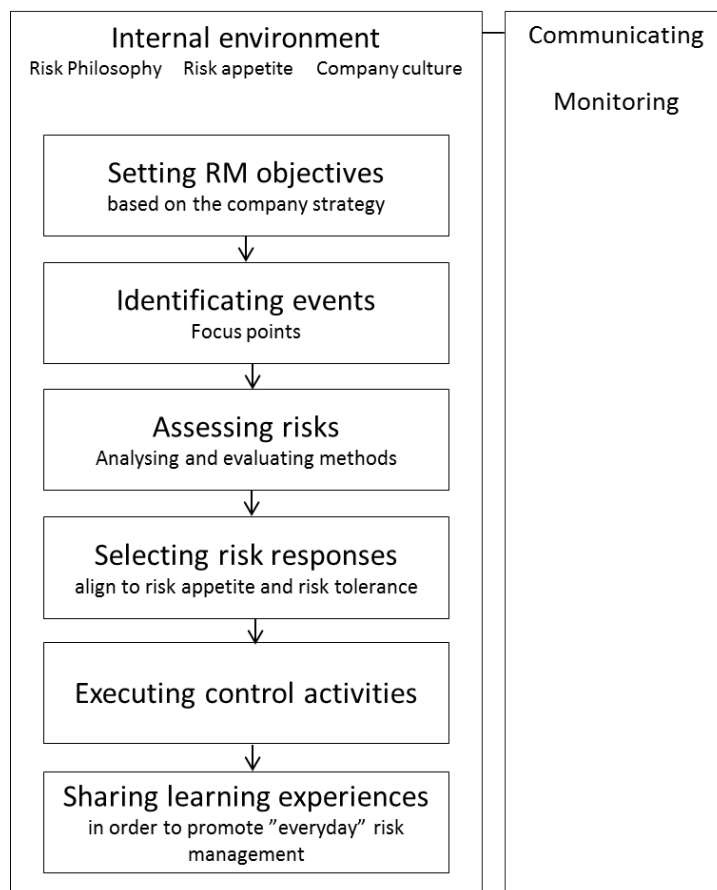


Figure 1. Risk management framework (adopted from ISO 31000, 2009; IRM; AIRMIC; ALARM, 2002; COSO, 2004; Lanne, 2007).

Even if some large international companies have adopted procedures for internal control, based on our experiences of company customers, in smaller companies risk management is often quite informal: company characteristics, organisation culture and customer's demands direct how they deal with the risks. We have seen many companies to flourish without any formal risk management procedures in use. Similar findings can be found in the literature. Some authors (e.g. Demidenko; McNutt, 2010) have also posed the critique towards formality and lack of practicality of

ERM. For example, Lalonde and Boiral (2012, p. 272) suggested that risk management should be seen more as a practice-based approach, “a strategy that managers *do* and not a strategy that managers *have*”. This is in line with the third definition of risk in Terje Aven’s abovementioned paper (2011): That is, risk is also a subjectively perceived phenomenon, the management of which depends not only on the formal procedures, but also individuals’ own interest and sensitivity.

Although the ERM concept is widely known, a lack of empirical research considering the effectiveness of ERM limits the maturity of the concept (Hoyt; Liebenberg, 2011). In the context of financial research Kraus and Lehner (2012) have systematically reviewed 25 articles regarding ERM and the value creation nexus. They found evidence of positive correlation between the implementation of an ERM program and value creation. However, more empirical research is still needed. In addition, there is still a lack of the research knowledge concerning effects of strong ERM culture to firm growth and its market value (McShane et al., 2011). Even less is known about the influence of ERM to value creation process and customer value and also vice versa.

5 Comparing value creation and risk management processes

The purpose of this paper is to identify and discuss the similarities and contradictions between the processes of value creation and risk management and to point out possible advantages and/or disadvantages that result from tying these approaches together. To identify and analyse the similarities and contradictions better, we have gathered the key features of both approaches in Table 1.

Table 1. Comparing the features of value-creation and risk management.

Features	Value creation	Risk management
Definition	A process that provides more novel and appropriate benefits than target users currently possess, and that they are willing to pay for (Lepak et al., 2007)	A process of identifying and analysing risk from companywide perspective (Chapman, 2003)
Aim	Competitive advantage, firm success, customer satisfaction and loyalty (e.g. Ulaga; Chacour, 2001)	Business continuity, preventing and avoiding losses, promoting increased risk awareness facilitating decision making, increasing shareholder wealth (Hoyt; Liebenberg, 2011)
Research disciplines	Marketing, management, service research	Engineering, management, psychology, insurance, accounting and finance
Theories	Transaction cost theory, resource-based theory, relational view to a firm	Financial theories, managerial theories, OHS management theories, risk compensation theory
Approach	Context-dependent, no formal procedures	Procedures based on standards and/or formal guidelines, process management, subjective perceptions (Aven, 2011)
Characteristics	Interactive, multifaceted, subjective, perceptual, experience (LaRocca; Snehota, 2014)	Managerial, formal/guided, integrated, preventative, perceptual, subjective
Elements	Benefits, sacrifices (Zeithaml, 1988)	Hazards, losses, possibilities, various impacts, uncertainty
Methods, tools	Value propositions, service development, service concepts, co-operation	Qualitative and quantitative risk assessment methods, checklists, (group) discussions, observation (van Duijne et al., 2008)
Participants	All levels of organisation, customers, suppliers and other stakeholders, shareholders	All levels of organisation, suppliers and other stakeholders, shareholders
Highlighting	Target user’s perspective, perception, co-operation	Early identification, prevention, internal control, decision-making
Critique	Ambiguity, too weak link to managerial practise (LaRocca; Snehota, 2014)	Focusing on negative effects, formality (Lalonde; Boiral, 2012)

At a fundamental level, there is a difference in the immediate aims of value creation and risk management. Whereas risk management aims at preventing and avoiding losses (Hoyt; Liebenberg; 2011), value creation is focused on firm's overall success through improving customer satisfaction and loyalty (Ulaga; Chacour, 2001). Though, in addition to preventing and avoiding losses, the ultimate goal of risk management is also in supporting firm's overall success through risk analysis, where all potentially harmful events are identified, prioritized and suitable risk mitigation actions are planned to prevent those harmful events from happening. Accordingly, the aim of ERM procedures is to coordinate management of all risks faced by a company. Especially systematic understanding of the interdependencies among risks is sought to support decision making. However, the ultimate goal has been seen more as allocating risks to play on a company's strengths rather than just reducing total risks. (McShane et al., 2011). This target comes closer to the aim of value creation – firm success and customer satisfaction.

Another difference between value creation and risk management stems from the traditions of different research disciplines. The roots of risk management are in a product-based industrial sector rather than in service business, although there is clear link to corporate finance. On the contrary, value creation has mainly been discussed and developed in the field of marketing and management sciences and service-oriented business. It is also our empirical notion that most sales managers prefer discussing value to risks with the customer, mainly due to its positive undertones that present the selling company in a more positive light than the negative risks do. Having its roots in accident prevention and insurance, risk management has mainly targeted firm's production processes and operations. Therefore, the customer perspective to risks and firm-customer co-operation in risk management seems to be overshadowed by the firm's internal perspective.

As an approach, risk management has a much higher level of formality than value creation. Risk management procedures are usually based on standards and/or formal guidelines (Aven, 2011), and specific methods like qualitative and quantitative assessments, checklists, (group) discussions and observation are applied (van Duijne et al., 2008). Formality in risk management has been seen as a necessity to ensure the comprehensive results of the analysis. In practice, this means that risk analyses typically yield a long list of issues that can go wrong. Not surprisingly, risk management has been sometimes criticised from being too negative as well as from too much formality (Lalonde; Boiral, 2012).

In contrast, value creation is regarded more as a perspective than a formal process. Specific methods or process phases are rarely mentioned in the context of value creation. Instead, more emphasis is put on developing and testing constructs and concepts like 'value proposition' or 'service concept'. As a result, conceptual ambiguities are claimed to be one reason why it has been difficult to turn the theories of value creation into managerial practice (La Rocca; Snehota, 2014). One way to do so would be to determine more carefully who creates what kind of value for whom, what kinds of resources and mechanisms are used, and from which perspective this process is approached (Saarijärvi et al., 2013). This shows some resemblance to risk management which emphasizes, for example, taking into account firm's internal environment, setting the objectives and the systematic identification of events.

Even though differences of value creation and risk management are salient and obvious, there exist some similarities as well. In addition to supporting the same ultimate goal – firm success – both approaches deal with intangible and context-dependent phenomena and emphasize subjectivity and the perceptions of customers or participants. Both risk and value have inherent uncertainties that require future-oriented approach. This is also why collective engagement and co-operation of various parties is essential to both approaches. On the other hand, both value and risk may relate to trade secrets, which hinder the open discussion between firms. Both approaches are also reminding decision makers to consider not only the direct cost advantages, but also consequences to processes, client-producer relationship, consumer behaviour etc. More recent developments in risk management, where risks are seen as both negative and positive impacts to the targeted activities, bring risk management one step closer to value creation ideology.

6 Conclusions

Risks have attracted the attention of some authors in value creation literature, but the visibility gained by the risks has – by no means – been extensive. Risks are considered as one of the least studied elements of perceived sacrifices by the marketing literature, and more focused research on risks has been requested. In this paper, we have tried to shed some light on the relationship of value creation and risk management through the review of selected literature and by comparing the key features of the approaches from firm's and customer's perspectives.

In this paper, we consider risks in value creation as all uncertainties related to the outcomes of the value creation process. These uncertainties can have either positive or negative impacts. The sources of risks are internal or external for a firm, and they may affect a firm and/or its customers, suppliers and its other stakeholders. Some risks are firm-specific, the others are shared, and the consequences may be similar or different to the different parties of the value creation process.

The concept of risk brings many rarely discussed issues of value creation together. That is, the component of sacrifice gets more attention. It is acknowledged that the value created can also be negative and that some value creation activities actually do not create value or even destroy it. Identifying these value creation related aspects, concerns or problems as risks, gives us a possibility to also consider risk management in the value context. As introduced in this paper, risk management is often described as a process consisting of several phases: identification of risk sources, risk assessment and decision making. In the value creation context, this would mean, first, identifications of internal and

external aspect affecting achievement of objectives – that is, value creation – and also distinguishing between risks and opportunities. Then, identified risks should be analysed by considering likelihood and impact of the identified risks to different parties. Finally, responses to risks should be selected and adequate risk mitigation measures should be taken into action. Here, avoiding, accepting, reducing, or sharing risks are identified as possible treatment of risks.

What are, then, the benefits that risk management would bring to value creation? At this point, we do not want to propose a formal risk management process for value creation as such. However, adopting some key features of risk management could already bring some benefits to value creating companies. These are the following:

- **Event identification.** A more risk-conscious approach to value creation would require becoming aware of the possible negative value outcomes and courses of events that lead to these. As more attention is usually paid to the positive outcomes of a product or a service, considering the possible negative aspects could serve as a means of raising ‘what if’ questions. For example, what if the production of a service is 30% more expensive than anticipated? What if the customer does not see the benefits of the updated product and is not willing to pay? From a firm’s perspective, this would mean a systematic stance towards identifying all the possible negative outcomes, value destroyers, slippage of value, sources of negative value, etc. From customer perspective, hazard identification should focus especially on possible performance and finance risks.
- **Risk assessment.** A good risk management process is not only about a large number of identified risks but also conscious risk comparisons and prioritisation. Categorizing likelihood of an incident that could initiate a negative outcome to the customer (and further to the firm), and also estimating severity of harm or damage, gives an option to increase firm’s sensitivity to customer’s (and their own) problems and also makes the decision-making on risks more visible and consistent.
- **Decision making.** In risk management, the systematic evaluation of risk lays the foundation for the selection of response measures targeted for avoiding, accepting, reducing, or sharing the identified risks. From the perspective of value creation these risk mitigation activities are trying to protect the process of value creation and the ultimate value created. However, ensuring that value is not destroyed via preventative actions should also be considered.

Through better risk management activities in a firm, risks falling upon customers could be prevented. By hindering service related incidents that could lead to negative outcomes, value is added to the customer. Turning this around, uncertainties in the business processes and environment may jeopardize firm’s ability to create value. Following Ravald and Grönroos (1996), who state that customer value can be increased not only by offering more benefits to customer but also by reducing customer-perceived sacrifices, we argue that more value can be added by reducing uncertainties involved in value creation, and that risk management offers appropriate tools for this purpose.

For a firm, implementing risk management practices could give an impulse to develop practical methods that support value management as well. Respectively, value creation emphasizes customers’ world and positive value adding consequences. These have traditionally attracted less attention in risk management and, thus, could widen the scope of risk management. Beside various obvious advantages, some disadvantages may also result in tying these concepts together. For example, higher level of formality, which is typical of risk management practices, may harm the creativity and agility of value considerations. Alongside changes in management practices, risk awareness may necessitate cultural learning. This, however, may cause a clash of views.

Instead of adopting high formality level and philosophy of internal control from risk management, we suggest to increase risk consciousness in value creation. The logic is to add value by decreasing uncertainty and become aware of risks that are generated to customers and further to firm’s own operations. Although we acknowledge the difficulties in open discussion and co-operation in risk management between firms, we encourage firms to take the risks of value creation to sales agenda. This would lead to a more risk-conscious value creation on both sides of the dyad. Moreover, identified and assessed risks should be treated with proper mitigation activities. Risk treatment actions aim at stopping the sequence of events that generates negative outcomes, or at least hinder the negative impacts to enter ‘customer’s side’.

We conclude that the interrelationship of value creation and risk management is interesting and offers new insights to both approaches, but more research work is still needed in order to understand abilities to amalgamate the benefits of value creation and risk management. At first, empirical research considering the effectiveness of risk management in service business is required. This includes, for example, consideration of risk management methods and practices used in service business as well as the impacts of risk management from the firm and customer perspectives. After that, the connection of value creation and risk management can be studied in more detail.

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Ecologie industrielle et développement territorial durable le rôle des services

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Potentiellement créatrice d'effets d'agglomération favorisant la génération et l'attractivité d'activités nouvelles, l'écologie industrielle peut être considérée comme un vecteur de développement territorial durable. Mais il est nécessaire de pallier aux difficultés (techniques, économiques, informationnelles...) liées à la mise en œuvre des symbioses industrielles. Nous étudions le rôle que peuvent jouer les activités de services, publiques et privées, dans la réduction de ces difficultés. Par leurs fonctions relatives à l'organisation des relations marchandes, à l'acquisition ou au maintien des capacités par les agents ou encore à l'aide à la décision, les services peuvent réduire les coûts de transaction engendrés par la mise en œuvre de symbioses industrielles et accompagner les décisions stratégiques des entreprises.

Industrial ecology may generate agglomeration effects favorable to business development and territorial attractiveness. As such, it may be considered as a tool for sustainable territorial development. But it is necessary to reduce the (technical, economic, informational...) difficulties ensuing from the implementation of industrial symbiosis. We study the role that service activities, whether public or private, play in the reduction of these difficulties. Through their functions linked to the organization of market relations, to the acquisition and the strengthening of agents' capabilities and to decision support, services can reduce transaction costs ensuing from the implementation of industrial symbiosis and be a support to strategic decisions of enterprises.

Mots clés : écologie industrielle, symbiose industrielle, activités de service

Introduction

L'écologie industrielle cherche à créer une analogie entre les écosystèmes naturels et les systèmes industriels afin d'aboutir au développement durable (Frosch, Gallopoulos, 1989). Elle s'appuie sur quatre leviers d'actions : la valorisation systématique des déchets comme ressources, la minimisation des pertes par dissipation (énergie, émissions polluantes...), la dématérialisation de l'économie (qui se traduit par le remplacement des produits par des services) et l'objectif de décarboner l'énergie (Erkman, 2004). Si les expériences d'écologie industrielle se sont multipliées de par le monde depuis la fin du 20^e siècle, les expériences « réussies » sont beaucoup moins nombreuses. De nombreuses difficultés apparaissent en effet dans la mise en œuvre de l'écologie industrielle, qu'elles soient de nature technique, économique, informationnelle, organisationnelle, infrastructurelle ou réglementaire (Erkman, 2004, Gibbs et al., 2005, Sakr et al., 2011, etc.).

Dans cette recherche, nous faisons l'hypothèse que l'écologie industrielle, potentiellement créatrice d'effets d'agglomération favorisant la génération et l'attractivité d'activités nouvelles, peut être un vecteur d'un développement territorial durable (Laperche et al., 2014). Un territoire entrepreneurial durable peut être défini comme une zone géographique caractérisée par des relations synergiques entre les acteurs, dont le développement repose sur un cadre institutionnel propice à la création d'éco-entreprises et à la transformation des activités existantes dans une perspective de développement durable (voir Boutillier, Uzunidis, 2014). Nous nous situons donc dans les préoccupations de « l'écologie industrielle et territoriale » (Buclet, 2011), qui cependant n'explique pas précisément les mécanismes économiques par lesquels le développement économique local peut émerger des expériences d'écologie industrielle. Selon nous, la première étape pour favoriser le développement territorial durable à partir de l'écologie industrielle consiste dans la réduction des difficultés liées à la mise en œuvre des symbioses industrielles.

Nous étudions dans cette recherche le rôle que peuvent jouer les activités de services, publiques et privées, dans la réduction de ces difficultés. Au-delà des prestataires de service traditionnels liés à l'écologie industrielle (ex : services liés au traitement des déchets, services proches de l'industrie), certaines activités de services non encore totalement exploitées par les entreprises industrielles peuvent pourtant s'avérer être des atouts dans le cadre d'une stratégie d'écologie industrielle. Ainsi, par leurs fonctions relatives à l'organisation des relations marchandes (fluidification, coordination amont et aval), les activités de service peuvent en effet réduire les coûts de transaction engendrés par la mise en œuvre de symbioses industrielles. Par les fonctions relatives à l'acquisition ou au maintien des capacités par les agents (en particulier en matière de formation, d'éducation), les services peuvent aussi fournir les ressources humaines nécessaires au bon développement de ces stratégies. Les services cognitifs d'aide à la décision et de recherche, en ingénierie industrielle mais aussi en sciences sociales, pourraient également accompagner les décisions stratégiques de ces entreprises, et notamment réduire ou prévenir les problèmes organisationnels et humains liés à la mise en place de l'écologie industrielle.

Ce document se compose de trois parties : la première partie revient sur la définition de l'écologie industrielle et son rôle dans la construction de milieux innovateurs. La seconde partie traite des difficultés liées à la mise en œuvre des symbioses industrielles et la troisième partie étudie le rôle des activités de service dans la réduction de ces difficultés.

1 Ecologie industrielle, circuits courts industriels et milieux innovateurs

1.1 Ecologie industrielle, métabolisme et symbiose industriels

Si la réflexion sur les manières de réduire l'impact environnemental des activités industrielles est ancienne et s'est particulièrement développée dans le courant des années 1970 dans le cadre de l'UNEP (United Nations Environment Program), c'est dans les années 1990 que l'expression se popularise notamment avec la publication de l'article de Robert Frosch et Nicholas Gallopoulos (1989), tous les deux ingénieurs chez General Motors. Les auteurs définissent l'écologie industrielle comme « *l'ensemble des pratiques destinées à réduire la pollution industrielle, elle vise à réorganiser le système industriel de façon à ce qu'il soit compatible avec la biosphère et viable à long terme* ». La pollution, l'accumulation des déchets et l'épuisement des ressources naturelles sont des éléments qui ont conduit Frosch et Gallopoulos (1989) à remettre en cause le modèle de développement des économies industrielles et à formuler la notion d'écosystème industriel (Diemer, 2007) : « *Ainsi dans un système industriel traditionnel, chaque opération de transformation, indépendamment des autres, consomme des matières premières, fournit des produits que l'on vend et des déchets que l'on stocke. On doit remplacer cette méthode simpliste par un modèle plus intégré : un écosystème industriel* », (Frosch et Gallopoulos, 1989, p. 106). Ils développent l'idée selon laquelle il devient nécessaire de recycler et d'échanger les biens utilisés, afin de réduire l'épuisement des ressources naturelles et de rechercher des matières premières de remplacement.

Cet article a suscité un intérêt très important dans la communauté scientifique, notamment par sa publication dans un contexte de prise de conscience croissante de l'importance de l'impact des activités humaines sur l'environnement et de la nécessité de mettre en œuvre un mode de « développement durable », tel que défini en particulier de la rapport Brundtland en 1987 (voir Laperche et al., 2009).

Pour Suren Erkman (1998, 2001, 2004), l'écologie industrielle, qui peut être perçue a priori comme un oxymore, repose sur l'idée selon laquelle le système industriel peut être décrit, tout comme un écosystème naturel, par une circulation particulière de matières, d'énergie et d'informations. De plus, le système industriel dans son ensemble repose sur des ressources et services fournis par la biosphère. Pour l'auteur, l'écologie industrielle offre des solutions concrètes en faveur du développement durable et s'éloigne en particulier des solutions en bout de chaîne (end of pipe) habituellement proposées pour faire face aux problèmes environnementaux.

D'un point de vue pratique, l'écologie industrielle repose sur 4 piliers (parfois aussi déclinés en 7 propositions) rappelés de l'encadré 1.

Encadré 1 : les 4 piliers de l'écologie industrielle (selon Erkman, 2001)

- **La valorisation systématique des déchets et des sous-produits**, qui doivent être vus comme des ressources potentielles et des gisements de matières premières à exploiter
- **Les pertes par dissipation doivent être minimisées**, (énergie, émissions polluantes ...), en effet, les dissipations peuvent être inhérentes aux produits mais aussi aux processus de production ou d'utilisation,
- **L'économie doit être dématérialisée** par la minimisation des flux totaux de matière tout en assurant des services au moins équivalents (économie de la fonctionnalité,...etc.),
- **L'énergie doit être décarbonée**. Depuis un siècle et demi, elle est principalement obtenue à partir d'hydrocarbures d'origine fossile (charbon, pétrole, gaz), responsables de nombreux problèmes tels que l'augmentation de l'effet de serre, les marées noires, etc.

Sa mise en œuvre repose sur la notion de **métabolisme industriel** qui correspond à l'ensemble des flux d'énergie et de matière qui circulent dans le système industriel. Il s'agit d'une approche descriptive qui recense et mesure les différents types de flux. Mais l'écologie industrielle va au-delà de l'analyse du métabolisme industriel et intègre la compréhension de la manière dont le système fonctionne, la manière selon laquelle il est régulé et ses interactions avec la biosphère. Pour Erkman, elle repose sur trois éléments clés : une vision systémique et intégrée de tous les composants du système

industriel et de ses relations avec la biosphère ; l'accent mis sur le substrat biophysique des activités humaines ; le rôle central de la technologie comme un des éléments cruciaux de la transition du système industriel actuel non durable en un écosystème viable à plus long terme. Cette vision systémique et globale du système industriel confère selon l'auteur un rôle clé en matière de développement économique, en particulier au niveau régional.

Pour autant, tous les auteurs ne partagent pas cette confiance dans la technologie comme vecteur de transition du système industriel et il existe en réalité deux visions opposées dans l'analyse et la mise en œuvre de l'écologie industrielle (Buclet, 2011).

- Pour les uns, comme pour Erkman évoqué ci-dessus, la mise en œuvre de l'écologie industrielle dépend du progrès technique (Allenby, Richards, 1994 ; Erkman, 1998). En terme de développement durable, cette approche empreinte de déterminisme technologique relève d'une soutenabilité/ durabilité faible¹⁷².
- Pour d'autres auteurs, la mise en œuvre de l'écologie industrielle nécessite un changement radical et une interface nouvelle entre les sociétés humaines et les écosystèmes naturels (Erhenfeld, 2004). Cette approche, critique de la société consumériste, s'inscrit alors d'avantage dans une approche relevant de la soutenabilité / durabilité forte¹⁷³.

Entre les deux, de nombreuses approches mettent en particulier l'accent sur l'importance du facteur humain (rôle de la confiance et des réseaux) dans la mise en œuvre de l'écologie industrielle, qui dans la réalité est inhérent à tout processus de diffusion des innovations (qu'elles soient techniques ou organisationnelles).

La notion de **symbiose industrielle** (Chertow, 2000) met l'accent l'échange de flux de résidus issus d'un processus de production pouvant être de la matière, de l'eau ou de l'énergie à destination d'un autre procédé de production, de façon à ce que les déchets ou sous-produits des uns deviennent des ressources pour d'autres. La mise en œuvre d'une symbiose industrielle repose sur la mise en place de synergies entre les acteurs. On distingue deux formes de synergies : les synergies de substitution et les synergies de mutualisation (encadré 2).

Encadré 2 : Synergies de substitution/ synergie de mutualisation

Synergie de substitution

« Une synergie de substitution consiste à substituer un flux entrant neuf par un flux sortant d'une autre entreprise qui est mal ou pas du tout valorisé. Par exemple :

- remplacer un flux de matières premières « neuves » consommés par un procédé par un flux de déchets ou de co-produits,
- un flux d'eau propre par un flux d'effluents liquides ou d'eau industrielle,
- un flux de combustible fossile par un flux de combustible alternatif (issu de déchets) ou par de l'énergie rejeté par une autre entreprise (vapeur excédentaire...)...

Ce type de synergies peut permettre de **faire diminuer les coûts d'approvisionnement ou les coûts de traitement pour un flux sortant.**

Sur le plan environnemental, il peut permettre d'économiser des ressources non renouvelables et d'éviter les émissions de polluants et de déchet liés à la production des matières premières neuves qui ont été substituées »

Synergies de mutualisation

« Lorsque plusieurs entreprises consomment ou rejettent le même type de flux il existe une possibilité de mutualiser la fourniture ou le traitement de ces flux en réalisant des économies financières et environnementales.

Lorsque plusieurs entreprises voisines utilisent le **même type de vecteur énergétique** (vapeur, air comprimé), il peut s'avérer intéressant d'en mutualiser la production. Une optimisation de cette production, une limitation des matériels à acheter et à maintenir permettrait de **rationaliser les coûts d'approvisionnement mais également, sur le plan environnemental, de diminuer la consommation énergétique des différentes entités »**

Source : UVED (Université Virtuelle environnement et développement durable, <http://www.uved.fr/>)

L'écologie industrielle a très vite été conçue comme un outil de développement local et régional (Gibbs et al., 2005). En effet, outre ses impacts positifs sur l'environnement, ses potentiels effets positifs sur l'économie et la société ont été mis en évidence. Dunn et Steinemann (1998) listent ainsi un ensemble d'effets positifs

- les déchets produits par une industrie produisent des inputs pour une autre, réduisant ainsi le coût de ces inputs
- la réduction des déchets signifie des coûts de l'élimination des déchets plus faibles
- les déchets ont dorénavant une valeur économique, accroissant les profits
- création d'une base économique plus variée

¹⁷² Dans le cadre de la **soutenabilité dite faible**, l'épuisement d'une ressource naturelle n'est pas une difficulté en soi car un autre capital, humain, matériel, technologique pourra s'y substituer.

¹⁷³ Dans le cadre de la **soutenabilité dite forte**, le capital naturel est reconnu comme apportant des fonctions extra-économiques et dans ce cas, la substituabilité n'est pas parfaite, et est donc en principe exclue, voir Vivien (2005).

- potentiel de création d'emplois par la création d'entreprises spécialisées dans des niches
- la réduction d'émissions signifie un moindre besoin de séparer les terrains industriels des terrains résidentiels ce qui conduit à la réduction des mouvements entre les deux

En définitive, l'écologie industrielle serait une stratégie « win - win - win » pour le développement durable, apportant des avantages financiers aux entreprises, mais ayant aussi des avantages sociaux plus globaux intégrant un impact environnemental moindre et une amélioration des conditions de travail.

L'écologie industrielle s'inscrit ainsi d'emblée dans une logique territoriale, et à ce titre on peut les rapprocher de la notion de circuit court, dont elle se présente comme l'une des formes.

1.2 Ecologie industrielle : une forme de circuit court

Les circuits courts sont définis de manière générique comme étant « les circuits directs d'échange ou de distribution de ressources contribuant à un développement territorial intégré » (Laudier et al., 2013, p.115).

Cette notion a d'abord été développée dans le cadre de l'agriculture et de l'alimentation (« circuits courts alimentaires ») pour exprimer la proximité entre le producteur et le consommateur. Si cette pratique est ancienne (elle était en particulier largement développée en France après la seconde guerre mondiale), elle s'est toutefois fortement développée depuis le début des années 2000 sous la forme d'AMAP. La notion de circuits courts repose sur une double proximité, de nature relationnelle (limitation du nombre d'intermédiaires) et spatiale (distance à parcourir entre le producteur et le consommateur).

Comme le soulignent Laudier et al. (2013, p.7), les circuits courts peuvent recouvrir des objets très variés, agriculture, recyclage, énergie, éco-industries, transports, innovation, circuits financiers... mais partagent le point commun d'un fonctionnement en boucle locale, dans le cadre d'une proximité territoriale.

A ce titre l'écologie industrielle peut être considérée comme une forme de circuit court, et partage ainsi un grand nombre de ses problématiques, que nous recensons en particulier à partir de Laudier et al., 2013.

- Elle repose en effet sur une approche d'interdépendance entre activités, destinée à valoriser les produits ou sous produits d'une activité dans le processus de production d'un autre.
- Elle repose également sur une vision systémique et intégrée du développement territorial, dans lequel le territoire, loin d'apparaître comme un espace géographique ou légal, est davantage considéré comme un système économique, caractérisé par les relations de proximité (organisationnelle, cognitive et spatiale) entre acteurs et qui vise à favoriser le développement économique et humain, tout en respectant l'environnement, donc un développement orienté vers le développement durable.
- Si la logique de l'écologie industrielle est territoriale (ce qui est affirmé en France par la dénomination « Ecologie industrielle et territoriale » qui met précisément l'accent sur cette dimension territoriale dans la mise en œuvre des pratiques de l'écologie industrielle (Buclet, 2011)), tout comme dans la logique des circuits courts, elle nécessite une articulation des échelles territoriales (locale, régionale, nationale, voir même internationale). La cohérence et le rôle moteur ne peuvent émerger que s'il existe une massification des flux qui nécessite souvent de dépasser l'échelle locale.
- Enfin, tout comme dans la problématique des circuits courts, l'écologie industrielle renvoie aux enjeux de gouvernance des territoires et en particulier des coopérations qui doivent se nouer entre acteurs privés et entre acteurs privés et institutions publiques locales. Au-delà des innovations technologiques, la mise en œuvre de l'écologie industrielle et surtout son utilisation dans un but de développement intégré des territoires repose en effet sur des innovations organisationnelles et sociales destinées à coordonner les coopérations existantes ou à en engendrer des nouvelles.

1.3 Ecologie industrielle et milieu innovateur

Le concept de milieu innovateur a été proposé par le groupe de recherche européen sur les milieux innovateurs (GREMI) en Suisse (Aydolet, 1986 ; Camagni, Maillat, 2006). L'hypothèse des chercheurs était que ce sont les milieux régionaux qui secrètent les différentes formes de l'innovation. Cette recherche a été à l'origine du développement de la science régionale¹⁷⁴. C'est une remise en cause des conceptions top-down, dans laquelle les progrès étaient censés venir de l'extérieur (de l'Etat notamment). Ils sont aujourd'hui considérés comme le « bloc cognitif » (ou encore le « cerveau ») dont dépend le fonctionnement des systèmes de production localisés (SPL), qui désignent un ensemble d'activité interdépendantes, techniquement et économiquement organisées et territorialement agglomérées (Torre, Tanguy, 2014).

L'économie locale peut alors être définie, lorsqu'elle est un milieu innovateur, comme un espace géographique formé en tant qu'ensemble de rapports systémiques entre entreprises et entre entreprises, Etats et collectivités (Uzunidis, 2007). Ces rapports systémiques caractérisent l'espace localisé par un certain type d'activités et de productions finales. Il est composé de trois niveaux :

¹⁷⁴ Avec aussi l'analyse des districts industriels qui remonte à A. Marshall (1919), et qui a été redécouverte par les économistes italiens de la troisième Italie (Brusco, 1982 ; Garofoli, 1992)/

- L'économie territoriale au sens géographique, historique et administratif
- Les institutions : entreprises de toutes tailles, Etat, collectivités territoriales en étroite relations (les relations peuvent être commerciales, financières, productives, informationnelles)
- L'action individuelle et relation personnelles et interpersonnelle

Ces trois niveaux sont en interaction.

En définitive, le milieu innovateur constitue « une agrégation des capacités d'actions et des facultés cognitives des différents acteurs » (Torre, Tanguy, 2014, p.311).

L'économie locale acquiert les caractéristiques d'un milieu innovateur grâce aux relations de proximité qu'elle propulse entre agents économiques. La notion de proximité est aujourd'hui une notion clé entre économie industrielle et en économie de l'innovation. D'abord, l'accent a été mis sur la proximité géographique (ou spatio-temporelle). Mais ce type de proximité n'est pas suffisant pour faire émerger une dynamique locale de création d'entreprises ou d'activités nouvelles et donc d'émergence d'un milieu innovateur. La coopération ne se décrète pas. Dans cette perspective, on peut séparer analytiquement (bien que les différents aspects soient indissociables dans la réalité) la proximité spatiale d'un côté et la proximité organisée de l'autre (Torre, 2009). Dans sa dimension organisationnelle, la proximité décrit des acteurs qui font partie d'une même organisation. Cette appartenance à une organisation (formelle ou non, firme, réseau,...), par l'intermédiaire des interactions, crée un apprentissage qui se renforce progressivement. On est proche parce que l'on travaille ensemble. Dans sa dimension institutionnelle (qui peut être intégrée dans la dimension organisationnelle), la proximité fait référence aux dispositifs institutionnels rendant les interactions possibles : des représentations partagées, règles, normes, cadres cognitifs ainsi que des institutions formelles qui stabilisent le contexte des interactions. On est proche parce qu'on partage un cadre institutionnel. Dans sa perspective cognitive, la proximité fait référence aux référentiels et aux acquis communs qui permettent aux acteurs de partager des connaissances et des savoir-faire, etc. (Martin, Boschma, 2010, voir aussi partie 1).

La localisation d'entreprises à proximité les unes des autres mais surtout le développement de formes de proximité plus complexes entre elles et également avec les institutions partenaires sont à l'origine d'effets d'agglomération. Cette notion déjà mise en évidence par A. Marshall et redécouvertes dans les analyses de la nouvelle économie géographique ; ces effets sont les suivants :

- la concentration géographique de l'activité permet de créer un marché du travail spécialisé et partagé
- un site géographique peut développer des inputs spécialisés (des actifs spécifiques) qui améliorent la productivité des entreprises (infrastructures communes : routes, communication ; accès à des matières premières spécifiques ou autres ressources spécifiques comme des compétences et des savoir-faire)
- la concentration géographique permet d'entraîner des retombées technologiques en termes de diffusion des connaissances. Alfred Marshall parlait à ce sujet d'« atmosphère industrielle ».

Nous considérons dans cette étude que l'écologie industrielle peut être un atout et un outil dans le renouvellement du tissu économique du territoire et la construction de milieux innovateurs. Les symbioses industrielles qui caractérisent l'organisation de l'écologie industrielle intègrent en effet les formes de proximité géographique, cognitives et organisationnelles fondatrices des milieux innovateurs. Notre approche va au-delà des analyses qui soulignent le rôle de l'écologie industrielle dans un projet de territoire (Beurain, 2008, Beurain, Brullot, 2011) et plus globalement des travaux de l'écologie industrielle et territoriale qui, rattachant l'écologie industrielle au territoire, semblent postuler un rôle actif de celle-ci dans son développement économique (Buclet, 2011).

Notre approche cherche au-delà à mettre en évidence les mécanismes par lesquels l'écologie industrielle peut être un outil dynamique de 1) stabilisation des activités économiques existantes, 2) d'attractivité de nouvelles entreprises et 3) de création d'une dynamique endogène de créativité et d'innovation. Elle vise aussi à en montrer les difficultés et à mettre en exergue les moyens de les résorber.

Cette approche dynamique s'appuie sur la mise en évidence des effets d'agglomération générés par les formes de proximité et qui peuvent avoir un effet positif sur la stabilisation des activités économiques, favoriser la création et la localisation d'autres entreprises. Les entreprises en place peuvent en effet bénéficier d'économies d'échelle externes, issues de la taille et des caractéristiques du milieu dans lequel elles sont insérées – économie de terme de coût du travail, infrastructures disponibles, matières premières, connaissances – qui justifient leur maintien ou leur installation sur place. En définitive c'est l'ensemble de l'attractivité structurelle du territoire qui peut être renforcée par la mise en œuvre de stratégies d'écologie industrielle (schéma ci-dessous). Une meilleure attractivité permettra la diversification économique par le biais de la création de nouvelles filières (comme des filières de traitement de déchets et de transformation de ceux-ci en matières premières utilisables par d'autres).

Schéma 1. L'écologie industrielle et la construction de milieux innovateurs.



Pourtant, ce schéma vertueux se heurte à de nombreuses difficultés dans sa mise en œuvre. Comme souligné plus haut, la coopération ne se décrète pas. La mise en œuvre de l'écologie industrielle nécessite des formes de coopérations multiples (et de formes de proximité multiples). Les stratégies d'écologie industrielle se heurtent ainsi à des difficultés / limites que nous recensons dans le point suivant et qu'il faudra résorber pour que l'écologie industrielle puisse jouer ce rôle dynamique dans le développement économique des territoires.

2 Identification des limites et difficultés dans les expériences d'écologie industrielle.

Dans la mise en œuvre de l'écologie industrielle et la création des synergies éco-industrielles, l'existence des synergies entre des entreprises ne veut pas dire pour autant qu'elles seront facilement réalisables. Des premières études portant sur le cas de Kalunborg (Danemark) aux multiples expériences de parcs éco-industriels qui ont fleuri de par le monde depuis quelques années (Gibbs et al., 2005, 2007), les principales limites et difficultés suivantes peuvent être mises en évidence (tableau 1) (Erkman, 2004, Gibbs et al., 2005, Geldron, 2012, Adoue, 2007, Duret, 2007, Sakr et al., 2011, Laperche et al., 2014, etc.).

Tableau 1. Limites et difficultés dans la mise en œuvre des symbioses industrielles.

Types de limites et difficultés	Explications
Techniques	Complexité des flux de déchets, dégradation de la matière, tri
Economiques	Rapport coût/bénéfice, échelle temporelle, limites quantitatives à la rentabilité
Informationnelles	Coordination/diffusion/confidentialité
Organisationnelles	Micro : l'organisation de l'entreprise n'est pas adaptée Méso : technologie indisponible, manque d'expérience
Réglementaires	Insuffisance des incitations / réglementation trop lourde
Infrastructurelles	Absence de services de transport, de stockage, de traitements adéquats
Humaines	Confiance insuffisante entre les acteurs

Source : auteurs

Les limites techniques de la synergie : l'entreprise doit faire face à la complexité des flux de produits à recycler, à la dégradation de la matière (Geldron, 2012), et à l'impureté des sous-produits utilisés dans le processus de recyclage.

Les caractéristiques physiques des flux valorisables peuvent rendre impossible l'établissement d'une synergie (Adoue, 2007), l'état physique et les dimensions des composantes de ces derniers sont parfois incompatibles avec le processus de fabrication du produit.

Le recyclage industriel dégrade les matières, les extraits de gisements perdent leur pureté dès les premiers stades de la fabrication, ils sont en effet mélangés et traités de divers additifs afin qu'ils aient les propriétés recherchées. Après le recyclage la matière se dégrade, (par exemple les caractéristiques mécaniques des fibres de cellulose diminuent à chaque cycle de recyclage), il ne suffit pas de récupérer les déchets mais il faut aussi conserver leurs propriétés durant le recyclage.

Le tri et la séparation des déchets sont également des défis techniques du recyclage (Erkman, 2004). Le tri des plastiques, des ferrailles mélangées, et de tous les types de déchets reste très coûteux, puisqu'il engendre des frais supplémentaires liés à la collecte et au transport. Cependant, il existe des matières qui n'ont pas été conçues pour être recyclées et qui sont pratiquement impossibles à valoriser, puisque la séparation de leurs composants pose plusieurs difficultés et représente des coûts importants pour l'entreprise

Limites économiques : la réalisation d'une synergie pour les entreprises dépend essentiellement de son intérêt économique puisque la décision de la mise en œuvre de celle-ci est basée sur le calcul des coûts, des prix et également la prise en compte des risques, la quantité des déchets est aussi considérée comme une limite économique, puisqu'elle engendre des coûts supplémentaires dans le cas où cette quantité est réduite.

La transformation des déchets en matière première nécessite des investissements importants puisqu'elle implique souvent l'achat de nouveaux équipements, l'exploitation et la maintenance de ces équipements. De ce fait, le besoin en ressources humaines qualifiées augmente et la formation de ces derniers est nécessaire afin de pouvoir maîtriser la mise en place d'une démarche d'écologie industrielle (Adoue, 2007). Les dirigeants des entreprises hésitent à investir dans l'écologie industrielle, étant donné le fait que la rentabilité de celle-ci se réalise sur le long terme, et ne répond donc pas forcément aux logiques et stratégies de rentabilité de court terme, s'ajoutant à cela le manque de fiabilité des démarches, ainsi que le manque d'expériences quant au cadre financier et juridique en matière d'écologie industrielle.

La rentabilité économique des pratiques d'écologie industrielle peut aussi se heurter à des limites quantitatives. Considérant le traitement des déchets comme une chaîne de production à part entière, la corrélation inversée des quantités traitées et des coûts reste la même que pour toute autre chaîne de production, dont la maîtrise en termes de coûts dépend essentiellement de la réalisation d'économies d'échelle. Autrement, les quantités de matières premières à traiter ne sont pas localisées chez un même « fournisseur », puisqu'il s'agit de déchets dont les quantités ne sont pas forcément importantes et qu'il faudra collecter jusqu'à atteindre un certain seuil de rentabilité qui permettra d'entamer le traitement.

Alors qu'il s'agit de plusieurs parties prenantes possédant des quantités différentes d'une même matière à traiter, il faudra sensibiliser ces acteurs-là quant à la nécessité de leur collaboration afin de parvenir à une gestion de cette chaîne de manière optimale à travers la massification des flux de matières.

Les limites informationnelles : les informations nécessaires à la mise en œuvre de l'écologie industrielle (notamment les éléments descriptifs du métabolisme industriel) ne sont pas toujours disponibles et nécessitent un travail de mise en commun, de traduction (mise en place d'un vocabulaire commun) de coordination et de diffusion. Elles sont aussi parfois rendues difficilement accessibles, et la culture du secret industriel peut freiner la circulation de l'information entre les entreprises. D'une part, la diffusion des informations sur les procédés (caractéristiques des matières utilisées, composants, quantité...) est parfois difficile pour les entreprises, d'autre part, les industriels n'arrivent pas à s'entendre et n'ont pas de confiance réciproque (Adoue, 2007) et préfèrent garder confidentielles les données des bilans des flux entrants/sortants qui sont nécessaires à l'établissement des relations éco-industrielles, ce qui rend l'établissement des synergies plus difficile entre ces dernières. L'indisponibilité des informations sur l'ampleur des impacts environnementaux de l'industrie peut être également un frein à l'écologie industrielle.

Les limites organisationnelles : l'indisponibilité des dispositifs productifs et des technologies adaptées aux traitements des déchets au sein des entreprises, ainsi que l'absence de culture du partenariat et du changement et la confidentialité des données affectent directement l'intérêt de mise en place des synergies.

Les limites réglementaires : la réglementation est un facteur essentiel pour le développement des synergies éco-industrielles. Elle a un impact sur l'intérêt des échanges de flux entre les industriels ainsi que sur la motivation de ces derniers. La réglementation et les outils fiscaux peuvent faciliter les opérations de valorisation, mais inversement l'insuffisance des incitations des autorités publiques, peut également négativement influencer sur la décision d'établir des synergies entre les entreprises.

Les limites infrastructurelles : les infrastructures nécessaires ne sont pas toujours disponibles notamment, les prestataires de service de transport et logistique, les services de traitements des déchets, les services des eaux, et les services de transformation des énergies et des flux de gaz.

La dimension humaine : le facteur humain joue un rôle primordial dans la réussite ou l'échec de cette stratégie environnementale, même si la réalisation des synergies s'avère économiquement possible, la résistance des dirigeants à la coopération avec d'autres entreprises, le manque d'implication dans une telle démarche, et même la réticence au partage des données sont des éléments qui font partie de la culture de la concurrence et du secret industriel et qui non seulement freinent la mise en place de l'écologie industrielle, mais qui aussi les empêche de créer des synergies pouvant être rentables à moyen terme, et faire en sorte que les coûts résultant de cette première soient couverts.

Ces difficultés dans la mise en œuvre pratique de l'écologie industrielle font que très souvent les parcs industriels ne correspondent pas à une définition stricte de l'écologie industrielle comme un ensemble de flux de déchet devenant la matière première d'un ensemble de processus de production mais intègre une « palette éco-industrielle » plus large s'intégrant dans une stratégie de développement durable (Gibbs et al., 2005).

Pour que l'écologie industrielle puisse être utilisée comme un outil de construction d'une économie territoriale fonctionnant sur la forme d'un milieu innovateur, il est alors nécessaire de réduire les difficultés/ limites auxquelles se heurte sa mise en œuvre opérationnelle. Nous considérons que ce sont les activités de services (publiques et privées) qui peuvent avoir cette fonction, comme expliqué dans le point suivant.

3 Quelles réponses les activités de services peuvent-elles apporter ?

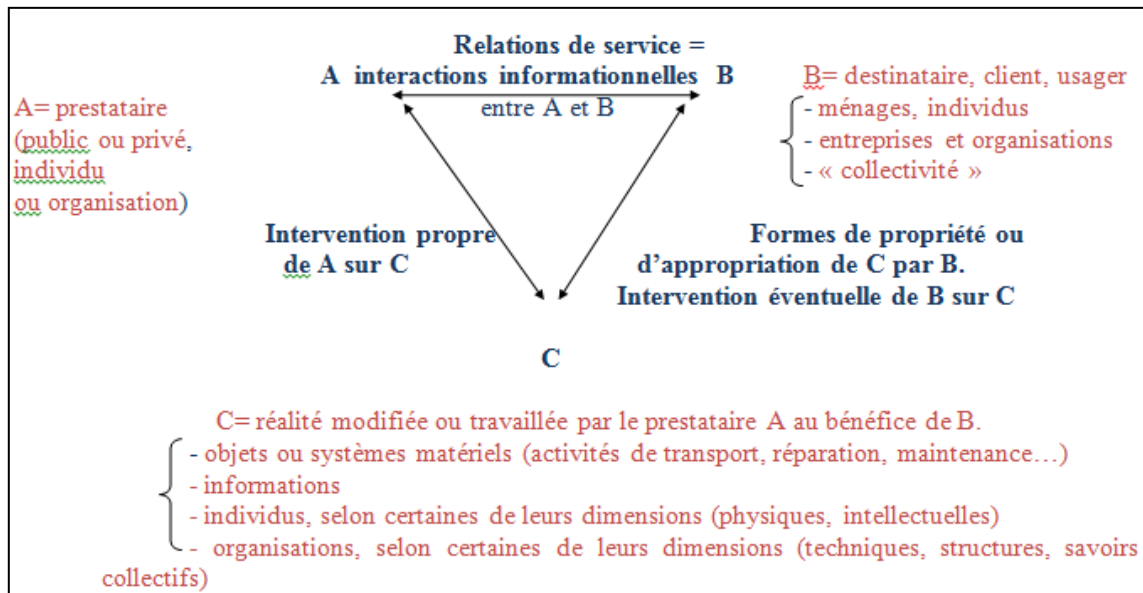
3.1 Définition des activités de service

Si les activités de services ont une place et un rôle croissant dans l'économie, l'analyse du rôle des services aux entreprises dans le développement local et leur prise en compte dans les politiques d'aménagement du territoire font rarement l'objet d'une attention spécifique. La prise en compte de leur rôle est souvent indirecte (Gallouj, Kaabachi, 2011 ; Gallouj et al., 2006).

Au sens traditionnel de l'INSEE, « une activité de service se caractérise essentiellement par la mise à disposition d'une capacité technique ou intellectuelle. A la différence d'une activité industrielle, elle ne peut être décrite par les seules caractéristiques d'un bien tangible acquis par le client. »¹⁷⁵.

Cette définition de l'institution statistique peut être complétée par des définitions plus analytiques, permettant d'isoler plus facilement certaines activités de service en fonction soit du destinataire du service, soit de la nature du prestataire de service et de son statut. Ainsi J. Gadrey (1996, p. 17) définit une activité de service comme « *une opération, visant une transformation d'état d'une réalité C, possédée ou utilisée par un consommateur (ou client, ou usager) B, réalisée par un prestataire A à la demande de B, et souvent en relation avec lui, mais n'aboutissant pas à la production d'un bien susceptible de circuler économiquement indépendamment du support C (on reviendrait alors à des situations de production agricole, industrielle ou artisanale.)* ». Cette définition a été représentée sous forme schématique par son auteur de la façon suivante (cf. figure 1).

Schéma 2. Le triangle des services.



Source : J. Gadrey (1996), p. 19.

Parmi les activités de service ainsi identifiées, certaines d'entre elles ont un rôle d'intermédiaire ou de facilitateur de l'organisation des relations marchandes. Elles sont indispensables au bon fonctionnement de la société et de l'économie. Elles appartiennent soit au tertiaire marchand (en particulier, les services aux entreprises, les transports, les activités immobilières et financières), soit au tertiaire non-marchand (notamment les services d'éducation, les administrations...).

¹⁷⁵ Insee <http://insee.fr/fr/methodes/default.asp?page=definitions/services.htm>

Comme nous le verrons, nous ne pouvons nous arrêter à cette définition statistique pour identifier les activités de service propices à l'écologie industrielle car le découpage d'entreprises réalisés par l'Insee exclus de la catégorie service aux entreprises certains types d'activités pour les remettre dans des rubriques plus homogènes non pas par activités de service mais par domaine d'activité.

Ces activités de service peuvent avoir un rôle direct dans la mise en place ou le fonctionnement de la stratégie d'écologie industrielle choisie, ou servent de « support » à un grand nombre d'entreprises (industrielles ou de services).

A partir du schéma précédent, il est possible de définir les activités de service qui nous seront utiles pour analyser les apports de ces services à l'écologie industrielle. Il s'agit d'activités de service dont le prestataire peut être soit une entreprise, soit une organisation (rarement un particulier) et dont le destinataire est généralement aussi une entreprise ou une organisation. Dans le cadre de l'écologie industrielle, on peut imaginer des prestations de service rendues pour le compte d'une entreprise mais dont la collectivité est aussi bénéficiaire (volontairement de la part de l'entreprise ou par externalités positives).

Ces activités de service proposent un certain nombre de fonctions (ou ont un certain nombre de rôles) qui participent activement au bon fonctionnement des processus d'écologie industrielle. Or, ces fonctions lorsqu'elles sont délivrées par des activités de service, sont souvent négligées par la littérature économique consacrée à l'écologie industrielle. Les auteurs ont tendance à se focaliser sur les techniques, les procédures de production et les innovations d'ingénierie industrielle. Ces auteurs mentionnent généralement ces activités de services plutôt comme des activités annexes, de soutien ou de support aux processus d'écologie industrielle mais n'y consacrent pas d'études indépendamment de l'ingénierie industrielle.

Cette mise à l'écart des activités de service est d'autant plus préjudiciable à la compréhension de l'écologie industrielle qu'une partie des limites de mise en œuvre de l'écologie industrielle ne relève pas de contraintes techniques mais plutôt de problèmes organisationnels ou de problèmes d'acquisition de capacités et de management des relations humaines, problèmes qui peuvent être résolus en faisant appel à des prestataires de service. Le tableau suivant répertorie de manière synthétique les fonctions de service permettant de répondre aux limites de l'écologie industrielle. Ces fonctions peuvent intervenir en amont (en prévention) lors de la réflexion sur la stratégie d'écologie industrielle, ou en aval (en réparation) lorsque ces problèmes sont apparus

Tableau 2. La contribution des services à la résolution des difficultés/limites de la mise en œuvre de l'écologie industrielle.

LIMITES Ecologie industrielle	Activités de service répondant à ces limites
<ul style="list-style-type: none"> - Technique (Echange technique irréalisable : cf. stabilité des déchets, continuité des flux, nécessité de retraitement) - Economique (économiquement non rentable ou risqué pour l'entreprise) - Informationnelle (l'information nécessaire n'est pas disponible) - Organisationnelle (micro: l'organisation de l'entreprise n'est pas adaptée; méso: implication des PME) - Infrastructure (les infrastructures nécessaires ne sont pas disponibles) - Régulation (pas d'incitation) - Humaine (Problème de confiance entre entreprises, problème d'organisation ou de confiance au sein de l'entreprise) 	<ul style="list-style-type: none"> - Services larges de formation éducation DD. <i>Ex: Commerciaux avec formation écologie industrielle (vente particulière des déchets)</i> - Réflexion sur un nouveau business model et pas seulement une stratégie (activités de conseil, recherche en sciences sociales) - Activités de coordination des acteurs locaux (publics-privés-associatifs) afin de faciliter les échanges d'informations et de connaissances ou d'expériences entre entreprises, développer les Mutualisations, Prospections. - Services d'aide à la décision (conseil, juriste, ingénieurs, mais aussi conseil en sciences sociales (management etc.)) - Prestataires de service avec solutions existantes Transport, logistique, circuit court Service de traitement des déchets, Services des eaux, Services proches de l'industrie

Source : auteurs

3.2 Les fonctions des activités de service dans l'écologie industrielle

Il est possible de regrouper ces prestations de service en plusieurs grandes fonctions de service (ou rôle de ces activités) susceptibles d'intervenir dans les processus d'écologie industrielle :

1) Le premier rôle est relatif à l'organisation des relations marchandes :

Certaines activités de service contribuent à **améliorer ou fluidifier l'information** entre les activités (industrielles, de services). Il s'agit des services de collecte et de mise à disposition d'information, ou de services d'ingénierie...

D'autres activités de service ont une **fonction de coordination « en amont »**. Elles permettent par exemple d'améliorer la prise de décision dans les négociations : Une fonction d'aide à la décision (de conseil), ou d'améliorer la phase recherche nécessaire à la mise en place de l'écologie industrielle (Prospection, Management, Organisation...).

D'autres encore ont une fonction de **coordination « en aval »**, autrement dit, ce sont des services périphériques que l'entreprise pourrait réaliser par elle-même en interne ou faire faire par un prestataire. Ces services constituent une fonction support pour l'entreprise (comptabilité, nettoyage, logistique, transport ...)

Dans le cadre de l'écologie industrielle, la proximité de ces partenaires ou prestataires de service est un élément important, comme nous l'avons étudié plus haut. Les services impliqués peuvent être des services marchands (sociétés privées d'ingénierie et de conseil) ou non marchands (administration territoriale, associations à but non lucratifs). Ces différents types de services jouent un rôle clé dans la coordination des acteurs et la fluidification des informations et donc dans la construction des liens systémiques entre eux, caractéristiques des milieux innovateurs.

Ces fonctions de coordination ou de fluidification élaborées par les activités de service sont génératrices d'innovations. Les innovations les plus visibles sont les innovations techniques. En suivant cette idée, nous pouvons remarquer que l'écologie industrielle, telle qu'elle est étudiée, l'est essentiellement dans une logique industrielle d'ingénieurs qui mettent en place des solutions techniques, ou des opérations de rationalisation de la production (Cf. par exemple Dannequin, Diemer, 2009 ; Diemer, 2012). Or, les travaux consacrés à l'économie de l'innovation montrent que les innovations organisationnelles (Modification substantielle de l'organisation du travail, de la gestion des connaissances et des relations avec les partenaires extérieurs, coopération entre services par exemple), sont essentielles à la bonne réalisation de ces solutions techniques. Même si elles ne sont pas l'apanage des activités de service, un grand nombre de ces activités de service (activités de conseil, etc.) facilitent le repérage ou la mise en place de ces innovations organisationnelles. Ces innovations peuvent être développées et intégrées grâce à l'apprentissage (ex : formation aux nouvelles pratiques de management environnemental, Innovation organisationnelle, développement de nouvelles formes institutionnelles).

Les transports sont incontestablement un exemple d'activité de services ayant un rôle important dans l'écologie industrielle. Ils permettent une coordination externe de la production dans sa dimension spatiale et temporelle et par conséquent ont un impact important sur la proximité et la dimension territoriale.

Focus sur la place des transports dans l'écologie industrielle

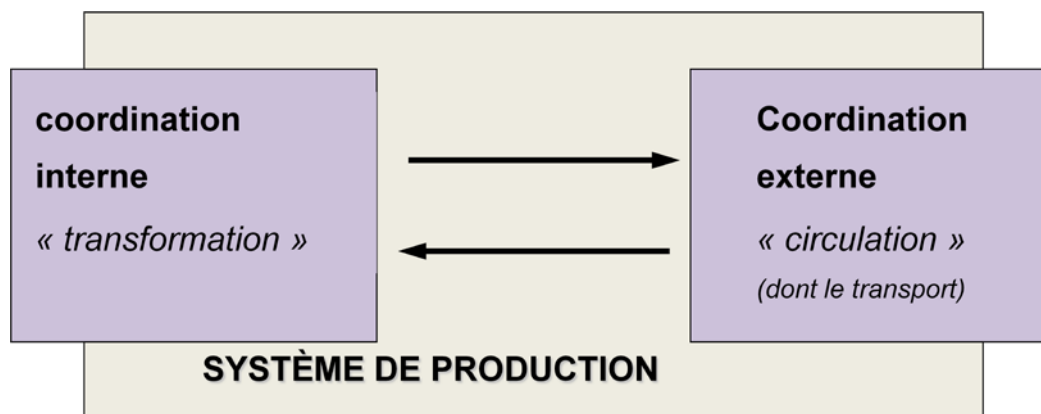
L'importance de la problématique du transport dans la ville entrepreneuriale durable apparaît d'emblée dans les chiffres sur ses impacts environnementaux. En effet, le transport dans son ensemble compte pour près d'un tiers de la consommation finale d'énergie et pour 27% des émissions de gaz à effet de serre (Ministère du Développement Durable, 2013). Le transport de marchandises, en particulier, contribue pour environ 10% aux émissions de CO₂ au niveau mondial. Comme le montre la revue de la littérature (cf Encadré), les transports sont ainsi généralement perçus comme défavorables au développement durable en raison des externalités négatives importantes, et , comme un facteur limitant le potentiel de développement de l'écologie industrielle.

Depuis une vingtaine d'années, les travaux sur les impacts du transport du point de vue du développement durable et sur les leviers d'action publique se sont multipliés. Une majorité de ces travaux portent sur le transport de personnes, en particulier sur le report modal (du recours de l'automobile vers le transport collectif et les modes plus doux) et plus récemment sur l'économie de la fonctionnalité (autopartage, covoiturage, systèmes de vélo en libre service...). En revanche, dans ce focus sur le transport dans la ville entrepreneuriale durable, nous nous intéresserons plutôt au transport de marchandises et à son insertion dans le fonctionnement de l'écologie industrielle.

L'insertion du transport de marchandises dans le fonctionnement d'une écologie industrielle territoriale

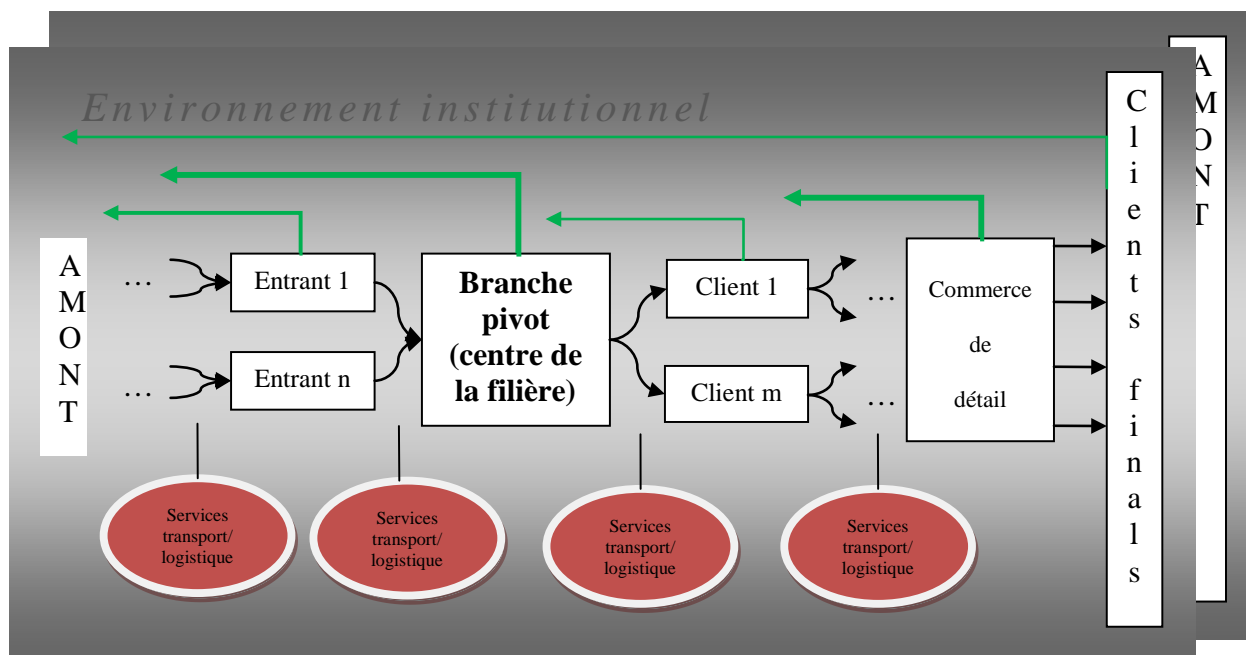
Il ne s'agira pas principalement d'analyser le transport de marchandises comme un secteur producteur de services ni du point de vue du développement durable en général (externalités négatives environnementales et sociales), mais de le prendre en compte dans son lien avec le système productif afin de mieux comprendre son insertion possible dans le fonctionnement d'un système territorialisé d'écologie industrielle. En effet, les services de transport de fret et de logistique contribuent à la circulation des biens et des informations au sein du système productif. Le schéma ci-dessous, inspiré des travaux de l'école suédoise des réseaux (Hakansson, 1987), représente la coordination du système productif en distinguant entre coordination *interne* (la transformation d'inputs en outputs) et coordination *externe* (avec l'environnement de ressources et de demande – fournisseurs, sous-traitants et clients). Les services de transport et de logistique sont un vecteur essentiel de la coordination externe de la production dans sa dimension spatiale (déplacement des inputs et des produits dans l'espace) et temporelle (stockage, mise à disposition des inputs et des produits à un moment donné, juste-à-temps). Le transport et la logistique font donc partie intégrante du système productif en ce sens qu'ils participent à sa coordination externe.

Schéma 3. Le transport et la logistique dans la coordination des systèmes productifs – cadre conceptuel.



Le schéma suivant part de la représentation classique de la filière de production pour y introduire le transport des flux de biens de l'amont vers l'aval. Les services de transport et de logistique interviennent entre toutes les étapes de la filière (autrement dit, à chaque flèche dans le schéma). Si l'on passe du schéma linéaire de la filière (de l'amont vers l'aval) à une représentation du système d'écologie industrielle en forme de boucle, il s'agit alors d'inclure les flux retours (représentés en vert sur le schéma 2), réinjectés dans le système à différents stades de la production. Or, à chaque flux dans le système correspondent des services de transport et de logistique.

Schéma 4. La place des services de transport de marchandises et de logistique – de la filière à la boucle de l'économie circulaire.



Ce schéma suggère donc une omniprésence des services de transport et de logistique (externalisés ou non) dans un système d'écologie industrielle territorialisée. Cependant, cette omniprésence ne signifie pas que ces services ont nécessairement un caractère essentiel ou stratégique dans le fonctionnement de l'écologie industrielle. En effet, une partie des services de transport concerne des opérations de logistique matérielle simple, techniquement peu complexes et réalisées par des prestataires non spécialisés. En revanche, d'autres services peuvent être techniquement plus complexes (nécessitant des équipements ou des compétences spécifiques, comme le transport de matières dangereuses), ou inclure des flux d'informations associés (logistique en juste-à-temps avec tracing/tracking et EDI, par exemple), ou encore nécessiter une coordination complexe et des connaissances et méthodologies spécialisées (systèmes logistiques complexes).

Encadré 3 : Le transport dans l'écologie industrielle, une revue de la littérature

Une première revue de la littérature nous montre que les questions de transport et de logistique ne sont que très rarement abordées dans la littérature sur l'écologie industrielle. En effet, dans ce domaine, le transport apparaît, tout au plus, comme un facteur limitant le potentiel de développement de l'écologie industrielle. Il est clair que si les coûts de transport pour les flux de matières, sous-produits et déchets réutilisés dans d'autres processus de production sont trop importants, pour des raisons techniques (nécessité de matériel spécifique, dangerosité des matières transportées), économiques (faible valeur des matières) ou organisationnelles (flux trop petits, trop fractionnés ou trop rares), le potentiel de l'écologie industrielle se trouve limité. De la même manière, si les externalités générées par le transport des flux retour (en termes de pollution, d'émissions de GES et de consommation de ressources) sont trop importantes en comparaison aux bénéfices attendus de la réutilisation des matières, le fonctionnement en symbiose industrielle n'a pas de sens.

Si le transport, et notamment les problèmes de coûts de transport, ne sont que rarement abordés explicitement dans la littérature économique sur l'écologie industrielle, il est souvent cité comme facteur limitant par les entreprises, comme le montrera notre enquête auprès des entreprises dunkerquoises. Les coûts de transports expliquent aussi en partie la dimension spatiale limitée des systèmes d'écologie territoriale. Cependant, le dernier rapport de la Fondation Ellen McArthur (vol.3, 2014) avance la possibilité de « boucles globales » (*global loops*) : sous certaines conditions de coût de transport, il est envisageable d'étendre les supply chains de l'écologie industrielle du niveau local ou régional à un niveau global. Le rapport cite en particulier les opportunités offertes par le déséquilibre des flux maritimes de conteneurs : du fait que les flux de conteneurs Est-Ouest (notamment depuis la Chine vers l'Europe ou vers l'Amérique du Nord) est plus important que dans le sens Ouest-Est, les prix de transport dans le sens Ouest-Est sont suffisamment bas pour pouvoir envisager d'envoyer des flux de déchets depuis l'Europe vers l'Asie pour traitement et réutilisation.

Constatant que la littérature économique sur l'écologie industrielle ne fait que peu de cas de la problématique des transports et de la logistique de ces flux, nous avons cherché à explorer deux autres domaines de la littérature : celle de l'économie des transports, d'un côté, et celle du Supply Chain Management en sciences de gestion, de l'autre.

Du côté de l'économie des transports, la problématique du transport de marchandises face aux enjeux de développement durable peut se résumer comme une limitation des effets externes négatifs, autrement dit comment « verdier le transport ». Les solutions proposées sont soit d'ordre technique (développement de véhicules, carburants, infrastructures etc. plus « propres »), soit de nature organisationnelle : comment encourager le report modal, la massification, la mutualisation des ressources et des équipements, l'optimisation des taux de charge et la limitation des retours à vide (Ernst&Young/PIPAME, 2013).

Du côté des sciences de gestion, la littérature sur le *supply chain management* (SCM) a connu un développement important autour des problématiques de développement durable depuis une quinzaine d'années. Nous avons identifié quatre approches en lien avec notre problématique :

La *reverse logistics* (Fleischman et al., 1997) s'intéresse aux supply chains dans le sens inverse des chaînes habituelles, mais il s'agit généralement d'une problématique de gestion optimale des flux retours de biens de consommation et non de gestion des flux de déchets.

La littérature sur les supply chains vertes (*green supply chains*) et le *sustainable supply chain management* (SSCM) a connu un développement très important. Le survey de Belin-Munier (2010) montre que les contraintes de développement durable modifient non seulement les objectifs du SCM, mais aussi sa mise en œuvre, en renforçant la dimension interorganisationnelle et l'intégration.

Les travaux en termes de *Logistics Social Responsibility* (LSR) (Carter/Jennings, 2002) appliquent la RSE (responsabilité sociale de l'entreprise) aux chaînes logistiques. Belin-Munier (2010) montre notamment que la RSE s'étend avec la diffusion des pressions de développement durable le long de la chaîne logistique et devient donc une problématique non plus de la firme, mais du réseau de firmes impliqué dans la chaîne logistique globale.

Le courant de l'*Integrated Chain Management* (Seuring, Müller, 2007) s'est développé surtout en Allemagne. L'ICM se fonde sur le cycle de vie du produit et avance la notion de « closed-loop supply chain management » qui englobe la logistique inverse et le recyclage. La gestion des produits en fin de vie, le recyclage des composants ou des produits, le traitement et la réutilisation des déchets suscite la création de nouvelles activités économiques qui peuvent restructurer les filières existantes ou créer des filières nouvelles. Cependant, la question du transport n'est pas abordée explicitement.

C'est donc surtout l'approche de l'*Integrated Chain Management* que nous retiendrons, en raison de sa proximité évidente du courant de l'écologie industrielle d'un côté, et d'une prise en compte explicite des institutions et de la dimension méso-économique.

2) Le second rôle est relatif à l'acquisition ou au maintien de capacités par les agents

Une seconde grande série de fonctions de service (ou un second rôle des activités de service) susceptibles d'intervenir dans les processus d'écologie industrielle consiste en **l'acquisition ou au maintien de capacités par les agents**. Nous avons précisé précédemment que les innovations relatives à l'écologie industrielle peuvent être développées et intégrées grâce à l'apprentissage.

Certaines activités de service proposent ainsi une fonction de formation, d'éducation (des étudiants ou salariés) ou encore une fonction d'aide à la décision plus ciblées sur les questions d'aide à la décision plus ciblées sur les questions de formation. Il pourrait s'agir également de fonction d'aide à la personne, de soins, etc. Dans le domaine de l'écologie industrielle, Boiral O. et Kabongo J. (2004), Boiral (2005) mettent en avant les savoir-faire organisationnels comme source de différenciation et d'avantages compétitifs (savoirs tangibles et intangibles), ainsi que la mobilisation de compétences spécifiques relatives aux procédés, aux matières résiduelles et aux différentes façons de les valoriser. Ces savoir-faire organisationnels, souvent étudiés essentiellement à la lumière de l'ingénierie, sont aussi en grande partie obtenus par des activités de service (conseil formation).

3) Le troisième rôle est relatif à l'émergence de nouvelles pratiques

Un troisième axe, concernant les prestations de service impliquées dans l'écologie industrielle n'est pas uniquement dédié aux activités de service. Il peut être développé au sein des activités industrielles. Il s'agit du développement de **nouvelles pratiques**, voire d'un **nouveau business model**, proposé par l'économie de la fonctionnalité (cf. D. Bourg, 2005, D. Bourg, D. Buclet, 2005 ; W Stahel, 2006 ; Gaglio G., Lauriol J., Du Tertre C, 2011).

L'économie de fonctionnalité consiste en la substitution de la vente d'une fonction d'usage (un service) à celle d'un produit, et étudie la production d'une solution intégrée de biens et de services (la vente d'une performance d'usage) permettant la prise en charge des externalités environnementales et sociales. Dans une telle optique, la valeur économique du produit ne repose plus sur sa valeur d'échange, mais sur sa valeur d'usage. L'objectif est d'optimiser l'utilisation – ou la fonction – des biens et services, en employant des richesses existantes (produits, connaissances, capital naturel).

Dans cette optimisation ou mutation économique, la place accordée aux services est importante, et la solution proposée s'inscrit dans une sphère **fonctionnelle** (mobilité, santé, habiter, etc.). Elle regroupe des acteurs issus de différents secteurs d'activité.

Un certain nombre d'entreprises industrielles proposent à côté de la production de biens, des prestations de services (Les exemples les plus connus concernent l'entreprise Michelin, Xerox, Dow Chemicals) participant à un développement durable. Il s'agit donc d'une forme de *servicisation* des entreprises industrielles dans la mesure où ces entreprises fournissent des systèmes produits-services de plus en plus sophistiqués. Ces solutions sont généralement entreprises dans le cadre de la mise en œuvre de stratégies environnementales (Laperche, Picard, 2013, Boutillier et al., 2014) et peuvent être entreprises dans une stratégie d'écologie industrielle.

Pour se développer, l'économie de fonctionnalité a besoin de faire évoluer les dispositifs institutionnels d'innovation, d'évaluation et de professionnalisation. Ces nouvelles solutions s'appuient sur (et développent) le patrimoine immatériel territorial. Par ailleurs, elle nécessite de profonds changements dans les relations entre producteurs et consommateurs. Cette recherche de nouvelles approches commerciales, de changements dans les modes de vie, de changements dans les pratiques et les comportements mobilisent bien entendu les activités de service (recherche, conseil, éducation, formation).

Ainsi, certaines solutions techniques sont davantage orientées vers les dimensions sociales du développement durable. Certaines innovations technologiques répondant aux problèmes de l'écologie industrielle peuvent constituer une trajectoire d'innovations environnementales et sociales qui profitent à l'ensemble de la collectivité.

Les services développent aussi des solutions plus spécifiques (perspective de différenciation, Djellal, Gallouj, 2009). Les services de conseil ou plus généralement les services de traitement de la connaissance, investissent de nouveau champ d'expertise (droit de l'environnement, conseil en développement durable, conseil méthodologique), qui auront un impact dans le domaine de l'écologie industrielle.

Par conséquent, dans la recherche de nouveau business model ou de nouvelles solutions innovantes, à côté de la création d'innovations technologiques (comme les technologies propres), il existe des relations plus complexes entre innovations technologiques (développés par exemple par les entreprises industrielles dans le cadre d'une stratégie d'écologie industrielle) et activités de service (Gadrey, 1996). On peut identifier des relations de substitution (on peut substituer totalement ou partiellement un outil technique innovant à un service, tel que les bornes d'information et de conseil) ; des relations d'identité (le service rendu constitue la valeur d'usage de la technologie. Ainsi, les biens matériels peuvent eux aussi être définis par le service qu'ils rendent. C'est ce qui fonde l'économie de la fonctionnalité) ; des relations de détermination (l'innovation technologique détermine l'apparition de nouvelles fonctions de service. Ex : conseil en environnement suite à l'apparition de technologies propres) ; des relations de diffusion (certains services participent à la diffusion des innovations technologiques et organisationnelles, ex: activités de conseil en haute technologie) et enfin des relations de production (les entreprises de service produisent elles-mêmes des innovations technologiques).

Conclusion

Nous faisons l'hypothèse que l'écologie industrielle peut être un outil dynamique de 1) stabilisation des activités économiques existantes, 2) d'attractivité de nouvelles entreprises et 3) de création d'une dynamique endogène de créativité et d'innovation. La mise en œuvre de ce type de circuit court industriel peut ainsi participer à la construction d'une économie territoriale fonctionnant sur la forme d'un milieu innovateur et orientée vers le développement durable ;

en d'autres termes à la construction d'un territoire entrepreneurial durable. Mais pour cela, il est nécessaire de résoudre les limites fréquemment rencontrées dans la mise en œuvre de l'économie industrielle. Selon nous, les activités de service peuvent répondre aux limites/difficultés de la mise en œuvre de l'écologie industrielle. Ils sont un ainsi un gisement de création et d'attraction d'activités nouvelles.

Notre cadre d'analyse est actuellement appliqué au cas l'agglomération de Dunkerque. Nous cherchons dans ce travail empirique à

- identifier les atouts et les limites dans la mise en œuvre des symbioses industrielles à Dunkerque
 - identifier les activités de services (publics, privés, parapublics) potentiellement liées à l'écologie industrielle sur le territoire Dunkerquois et étudier leur implication réelle dans les pratiques d'écologie industrielle à Dunkerque
 - identifier les activités de services (publics, privés, parapublics) utiles au bon fonctionnement du métabolisme industriel mais non présent sur le territoire
 - définir des recommandations pour favoriser l'amélioration des pratiques d'écologie industrielle à Dunkerque.
- Les résultats feront l'objet de publications ultérieures.

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Value co-creation and digital services in the book publishing industry

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The book publishing industry is in transition due to the digitalization of production, content, consumption, and practices. The increasing popularity of self-publishing services and the new generation of digital natives emerging as semi-professional writers revolutionize the conventional role of literary authors and the traditional value chain. To understand the change, this study focuses on the new logic of value co-creation underlying digital services. It places authors, readers, and stories at the core of the interaction, investigation, and innovation. As a result, the study provides three diverse value co-creation platforms responding to the digital transition within the book publishing industry.

1 Introduction

The book publishing industry is in the intersection of several industrial sectors. It is a part of graphical mass media in conjunction with the entertainment economy (Wolf, 1999) and the experience economy (Pine; Gilmore, 1999), and a sector of the cultural (Throsby, 2001; Hesmondhalgh, 2002; Van der Ploeg, 2004) and creative industries (Florida, 2002). According to O'Reilly (2006), book publishing industry is an exercise in the social production and distribution of art where publishing houses spread the business risk by building an offering portfolio in the value chain.

The advent of digitization has led to the blurring of borders between media channels and their artifacts (Xuemei et al., 2008). However, innovations and new competence are expected to be born in the hybrids of technology, business, and culture (Florida, 2002; Miles; Green, 2010). The fashionable concept of e-book is evolving in the midst of convergence, and there are readers with different offline/online reading practices (Marshall, 2010; Schultz Nybacka, 2011). Furthermore, a growing number of online book titles give rise to grey literature and the majority of books fail to receive enough attention from the audience due to the emergence of self-publishing services (Chandler, 2006) and the "long-tail" effect (Anderson, 2006).

The book publishing industry is being redefined upon the changes in digital work space for amateur writers and established authors that can cut out the middlemen in the existing value chain for business offerings. Following the notion of Normann (2001, 2007), the business offering development has three strong directions that redirect the focus of operations: servitization, experiences, and networks. Similarly, Lloyd (2008) states that the very nature of the book needs to be rethought in the digital networked era by approaching the book from the content perspective instead of a product or category approach, and by placing the book at the center of business operations rather than at the end of the production chain.

The growing roles of servitization, experiences, and networks have led scholars to acknowledge customer's active role in the consumption process and value co-creation processes that build on intangible resources and symbolic value (Vandermerwe, 1992; Prahalad; Ramaswamy, 2004; Payne et al., 2008). For instance, service-dominant logic (Vargo; Lusch, 2004) is a recent approach highlighting that the customer is always a co-creator of value. Co-creation of value is a hypernym that distinguishes the service-dominant logic from conventional goods-oriented production (Lusch; Vargo, 2006; Vargo, 2008).

The applicability of co-creation increases while firms and their value networks target to serve segments of one and provide unique experiences through individual tailoring, customization and innovation enablers (Etgar, 2008; Prahalad; Ramaswamy, 2004). Heinonen et al. (2010) suggest taking customer-dominant logic in services to focus on customer's life, practices, and goals related to the service instead of company actions. The provider supports customer's value creation processes (Grönroos, 2006, 2008) and customers determine the value in their own context (Heinonen et al., 2010). Service design, with its holistic process, method, and discipline, has been geared on understanding people's value creation elements and processes aiming at innovation and new value creation (Moritz, 2005; Maffei et al., 2005; Brown, 2009).

Customers have adopted the role as the main source of innovation, and service organizations design services with them – not for them (Ojasalo; Ojasalo, 2009). Building on service logic and value co-creation, this study aims to understand value co-creation underlying digital services. In particular, the study takes customer-dominant logic in service innovation and examines the consequences of digitization for the benefit of literary authors, their stories, and readers as well as value co-creation opportunities within service design. The research questions are:

- (1) What does value co-creation mean in the book publishing industry?
- (2) What types of authors, readers, and books there are in the digital era?
- (3) How authors and readers create value in the digital era?

The remainder of the study presents the theoretical foundations of user-driven service innovation and the value network paradigm in the digital context. Then, the paper describes the research methodology and data collection. After this, the findings from empirical research will be presented, including the types of digital era authors, readers, and books, and

related value co-creation platforms. Thereafter, the study reviews key findings and discusses implications to theory and practice. Finally, it concludes by presenting the limitations of the study and providing future research avenues.

2 Theoretical foundation

2.1 User-driven service innovation

Any service offering begins as a potential promise or value proposition (Vargo; Lusch, 2006; Barcet, 2010). Services are complex interactions that evolve through different relationships forming hybrid systems with people, places, organizations, networks, and related service systems (Manzini, 2011; Patricio; Fisk, 2011). Normann (2007), Lovelock and Wirtz (2011), and Grönroos (2006, 2008) regard services as (social) processes, whereas Tyagi and Gupta (2008) describe services as transactions or experiences that are co-created between customer and service provider (Vargo; Lusch, 2004). Heinonen et al. (2010) consider services from the customer's viewpoint and state that they are: i) outcomes of the service provider's internal activities, ii) co-creation processes and their outcome elements, and iii) process and outcome elements of the customer's own activities.

Innovation in services can take place in organization's capacity to deliver value, value offerings, and delivery interfaces (Maffei et al., 2005, Grönroos, 2010). Service management system quality (Normann, 2007), the management quality, and business model (Hamel, 2007) can be also regarded as sources of innovation. Ordanini and Parasuraman (2011) list service innovation sources as i) collaborative competences, ii) customer orientation, and iii) knowledge transfer. Den Hertog et al. (2010, 494) define service innovation "that consists of one or several of the following dimensions: new service concept, new customer interaction, new value system/business partners, new revenue model, new organizational or technological service delivery process".

However, the central role of users is frequently addressed in the innovation processes (Leminen et al., 2012; Nyström et al., 2014) and in service innovation research, in which focus is steered towards the interactive nature of innovation and the role of the customer (Howells, 2010). Placing the customer at the center of value creation directs focus on customer prerequisites to engage in value creation with their own resources, knowledge, and skills (Edvardsson et al., 2010) and on their unique interpretation of value (Michel et al., 2008; Heinonen et al., 2010). Consequently, a prerequisite for service innovation success is that the service provider and the customer recognize each other's value-creating strategies (Möller et al., 2008), companies actively participate in the customer's processes (Heinonen et al., 2010) and customers are provided with the knowledge and tools necessary for them to perform the tasks (Normann, 2007).

The key to user-driven innovation seems to be satisfying latent needs of the customer instead of expressed needs (Narver et al., 2004). Latent needs reflect what customers truly value but cannot explicitly request from the service provider (Senge, 1990; Matthing et al., 2004). Service design as a discipline focuses on understanding the elements of value through investigating the latent needs and hidden motives with multifaceted toolkits (Stickdorn et al., 2012; Polaine et al., 2013). Many of the early design researchers have a background in digital interface and interaction design (Blomkvist et al., 2012; Goodwin, 2009) where IT-related usability focus has transformed towards Human Centered Design (Meroni; Sangiorgi, 2011; Rogers et al., 2007). The meaningful design goes beyond technology-driven innovation by addressing people (Kim; Mauborgne, 2005) and by integrating concepts of business, technology, and design (Mager, 2004) to create different and differentiating value to the market (Drucker, 2007).

2.2 Value network paradigm

The Internet can be seen as an infrastructure of service economy in which networking is a basic form of human relationships (Barney, 2004; Castells, 1998) and a regular part of business processes (Hsu, 2009; Funk, 2009; Qualman, 2011). Mobile computing technologies provide users with ubiquitous access and enable user-generated content creation (Stewart; Pavlou, 2002; Krishnamurthy; Dou, 2008; Shao, 2009) as well as social object creation: "something that people look at, discuss, and pass from person to person, putting their own stamp on it" (Metz, 2012, 2). The most meaningful and interesting content affecting the purchase decisions is the one created by like-minded individuals, peer-groups, and horizontal networks (Funk, 2009; Kotler et al., 2010; Qualman, 2011).

The power in the network society is about abilities to access networks and control various flows (Barney, 2004). The "network effect" (Normann, 2007, 33) takes place each time a new member is added and the value accrues to the other members of the network. Therefore, the new economy has heightened the importance of relationship marketing (Gummesson, 1999) and customer relationship management (Greenberg, 2009). In marketing theory, the network approach confronted the traditional marketing mix of the 1980s by emphasizing that "relationships do not exist in isolation but are connected to each other so that every relationship is part of a wider network of relationships in the market" (Lindstrand et al., 2006, 2-3), whereas Vargo (2008) highlighted the network-to-network perspective in service-dominant logic.

In order to both increase knowledge within the organization and to maximize knowledge exchange with the outside world, companies increasingly cooperate beyond dyadic relationships creating dynamic inter-organizational networks, and, thus, transforming to network paradigm of business management (Kanter, 2001; Normann, 2007; Doz; Kosonen, 2008, 56). Markets have converted into forums for dialog and co-creation among customers, communities, companies,

and networks of companies (Prahalad; Ramaswamy, 2000, 2004; Ramaswamy; Khrisnan, 2008). Hence, customers have become equivalent to other participants (Edvarsson et al., 2010) in the enhanced network in which they co-create and extract business value with collaborators, co-developers, and competitors (Prahalad; Ramaswamy, 2000).

The position and power conception (Santos; Eisenhardt, 2005) in the value creating networks or value constellations (cf. Ramírez, 1999) can provide companies with knowledge and resources, new business potential, and an innovation boost as part of the collaboration and co-creation efforts (Camarinha-Matos; Afsarmanesh, 2004; Prahalad; Krishnan, 2008). Together with other organizations, companies may end up providing a particular piece of a complete ecosystem and thereby do things in the modular way (Doz; Kosonen, 2008; Bask et al., 2011). Moreover, they can build innovation labs (virtual and public beta labs) and living labs (which emphasize user's role in innovation in real-life contexts) to share new tools and to co-create, validate, and test new ideas (Leminen; Westerlund, 2012; Guzman et al., 2013; Nyström et al., 2014). Hence, the open innovation model provides an alternative to the conventional development (Chesbrough, 2003; van de Vrande et al., 2009). Its benefits include cost savings (Von Hippel, 2007), improved user value (Almirall; Casadesus-Masanell, 2010), and better innovation performance (Chiaroni et al., 2010).

The greatest positive impact on innovation comes from networks comprising different types of partners (Nieto; Santamaria, 2007), varied resources, and the ability to establish diverse relationships (Calia et al., 2007). Shirky (2008) reminds that the facilitation of goal-oriented collective action (i.e. groups acting as a whole) is the most demanding mode of social media practice even after collaborative production (cf. crowdsourcing, a term coined by Howe, 2006). Co-creation requires using user's operand (material objects) and operant resources (intangibles) (Arnould et al., 2006), understanding both intrinsic (experience is appreciated for its own sake) and extrinsic (experience is appreciated as means to an end) values (Holbrook, 2006), and fostering a broad array of reproducible and repeatable practices in order to build co-creative brand partners (Schau et al., 2009).

3 Methodology

3.1 Research design

The study follows design thinking principles and service design methods to gain insights on different authors, readers, and interaction needs/opportunities in the digital context. Concordant with the suggestions by Meroni and Sangiorgi (2011), this study focuses on digital service design from the perspective of functional paradigm (i.e. what services represent and can offer) as opposed to the interaction paradigm (i.e. how services are performed). Since the objective is to create novel and meaningful people-oriented solutions (cf. Verganti, 2009), the study takes an abductive method of reasoning (originated by Peirce, 1903) to foster something completely new by placing the story as a platform for value creation and co-creation between authors and readers.

3.2 Data collection

Credibility/reliability in this qualitative and adaptive research was addressed by focusing on the methodology and procedure (Kirk; Miller, 1986; Strauss; Corbin, 1998; Flick, 2002; Silverman, 2006). Several research methods were used (Aaltonen; Sanders, 2005) and the sample size and insights were evaluated throughout the process (Kvale, 1996; Glaser; Strauss, 1999). Furthermore, the strategy of theoretical sensitivity across categories (Glaser; Strauss, 1999) was needed in finding multiple sources for the investigation and to guarantee diversity and multidisciplinary essential for service innovation. In addition, the research took the grounded theory approach of "everything is data" (Ibid.).

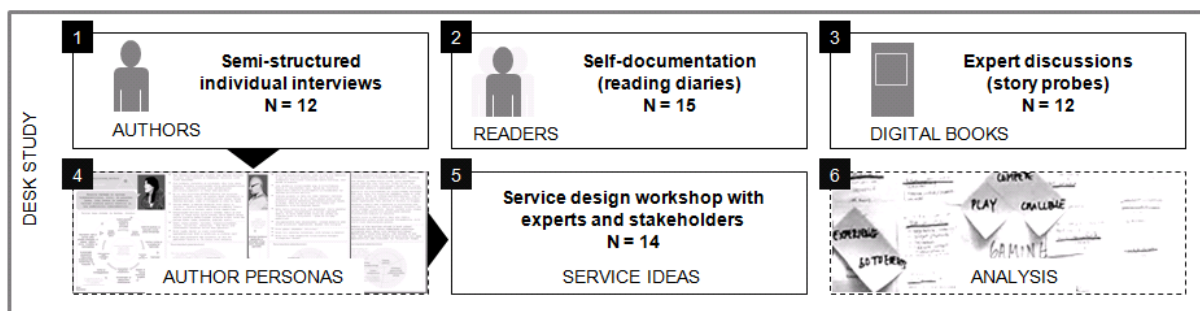


Figure 1. Main research entities and methods.

A careful documentation of the process benefits research reproducibility and generalizability (Straus; Corbin 1998) where validity relates to the aspects of what has been studied and how it has been interpreted (Kirk; Miller, 1986). Overall, the data was gathered by utilizing several strategies and sources to comply with the principle of data triangulation (Denzin, 1970) (Figure 1). The primary research was conducted in 2011 in Finland and the secondary research, taking place in 2013, enhanced existing results towards final outcomes.

The first step included semi-structured interviews with fiction and non-fiction authors as well bloggers (Appendix 1). They were interviewed mainly face-to-face about their creative processes and related interaction needs based on tested and thematized semi-structured agenda (cf. Kvale, 1996), including directive storytelling, broad descriptive key topics, and further questions (Flick, 2002; Silverman, 2006; Rogers et al., 2007; Goodwin, 2009; Saffer, 2010). The recruitment focused on the most appropriate informants with purposive and convenience sampling strategy (Morse, 1998; Tuchman, 1998) and with the objective to have both typical cases and dissimilar cases (Patton, 1987).

The top informant profile of fifteen readers was created and approached with self-documenting tools to understand the interactive process of reading. The study used convenience sampling when recruiting readers (Goodwin, 2009; Patton, 1987). The design probe (Mattelmäki, 2006; Polaine et al., 2013) was materialized to be a mobile and simple paper bookmark focused on the dialog and actions that the story evokes on emotional and cognitive levels. Bookmarks included the following sections: 1) instructions, 2) participant background information, 3) Free-form entry, 4) structured checklist for diary notes, and 5) statements about anonymous and confidential processing of data (ref. Silverman, 2006; Rogers et al., 2007; Kvale, 1996).

Twelve experts of various backgrounds were interviewed face-to-face, via Skype, and by email to gather insights about digitalization and the future digital books. These individuals were selected and approached through peer networks according to their expected level of new insights (Flick, 2002; Glaser; Strauss, 1999) and from the non-expert point-of-view (Van der Duin, 2006) to engage potential future value network actors. Each participant was emailed five statements regarding the future of e-reading (based on Leminen, Salo et al., 2010) and a couple of open-ended questions. Altogether, these questions formed the agenda for the expert discussions.

Finally, fourteen participants from different fields were invited to attend a service ideation/co-design workshop. The participants were divided into three teams. Each team completed a set of exercises according to created author personas and persona brainstorming (Curedale, 2013). The participant groups had two objectives; firstly, to generate ideas through divergent thinking (generating options) and secondly, to converge and co-design solutions based on the author persona understanding (making choices by evaluating) (Brown, 2009). Exercises resembled the storytelling game (Vaajakallio, 2012), as the participants discussed their own persona by changing perspectives each round, and they continuously recorded ideas.

3.3 Data analysis

Different types of data were recorded in the study: (i) Voice recordings, (ii) written documentations, (iii) research templates, and (iv) digital pictures. All data were prepared for the analysis and translated into Post-it notes. The data was coded, categorized, and clustered on different affinity walls for the purpose of designing the needed artefacts and outcomes. The analysis took advantage of various analytical approaches to find a reliable categorization scheme and to ensure that the analysis can be replicated (Flick, 2002; Goodwin, 2009; Rogers et al., 2007).

Author personas were created for the service design workshop purposes (Williams, 2006) both to inspire service ideation and to validate the personas. Single and cross-case analyses were used for identifying differences and commonalities between author respondents, and continuums were created from the single cases with primary spectrums related to needs, resources, and practices (Flick, 2002). Then, similar single cases were identified and divided into three possible personas. The personas were tested with inductive reasoning by deriving a statement based on the primary data and finding explanations from the secondary research (Goodwin, 2009).

Reader profiles were identified on the basis of desk research and supported by the conducted reader study. The data were coded and analyzed similarly to author persona creation, but the approach was more in deductive reasoning which started by creating a secondary research based statement and tried to find supportive data from the primary research data. Deductive reasoning was utilized especially with more future-oriented readers, authors, and digital book evolution. Three types of digital book were created on the basis of desk research, supported by the conducted expert interviews. However, the analysis required pattern experience (Richardson, 2010) and previous knowledge (Glaser; Strauss, 1999) from the researchers.

Finally, a qualitative content analysis (Flick, 2002; Rogers et al., 2007) was once more utilized for coding service ideas that were gathered throughout the research, in particular from the service design workshop. The coding distributed service ideas into actor-based categories, such as author- or reader-specific features of the digital book, and services concerning current or future value network members. The data were filtered aiming for the most potential service concepts; forward-looking, yet feasible concepts, which present user value and business potential (Moritz, 2005; Brown, 2009). These priorities were already discussed in the service design workshop with experts and stakeholders.

4 Findings

4.1 Three platforms to digital era storytelling

The study identified three types of authors, readers, and books for digital era (Table 1). Further, focusing on co-creation and value creation opportunities among authors, stories, and readers, the study identified three value co-creation platforms for the digital era (Figure 2). Considered from the perspective of sequences, the value co-creation platforms in Figure 2 include the aspect of evolutionary development. This is noticeable in terms of digital technology advancement

and the growing number of digital natives as authors and readers. The evolutionary aspect highlights the increasing control of the reader on social reading practices through modular making.

The platforms in Figure 2 also consider the aspects from customer-dominant logic in services (Heinonen et al., 2010), namely: 1) co-creation processes and their outcome elements, and 2) process and outcome elements of the user's own activities, and 3) user values (cf. Holbrook, 2006). However, the platforms are not only serving the needs of authors and readers, but are regarded as the most potential responses to the challenges in digital transition and transformation faced by the existing book publishing industry. The next sections describe each value co-creation platform.

Table 1. Types of authors, readers, and books in the digital era.

AUTHOR TYPES & NEEDS	WRITER	PROCESSOR	CONDUCTOR
	is the closest to the contemporary cultural and commercial author (O'Reilly, 2006; Brown, 2006; Boorstin, 1992) who concentrates on publishing titles and evolving "own recognizable style and tonality" (Author A6). Writer wants to engage with readers in digital space.	feels that "a variety of writing projects supports creative process rather than disturbs it" (Author A5). Processor is digital native who posts topics that matter and educate to "solve things or bring up new and fresh approaches" (Author A9). S/he wants to engage with people "who matter the most" (Self-publisher B11).	neglects existing boundaries and categories by establishing and blending things into totalities or "sensorial spaces" (Author A3) for the story. Conductors do not ask who they are "which combination of my selves am I today" (Barney 2004, 18) and who are with me in creative process.
BOOK TYPES & CATEGORIES	LAYERED BOOK	CO-CREATED BOOK	HYPERMEDIA BOOK
	A digital book as a hub for new content elements, features and services related to the story. These elements result different interaction layers "on top of" the original story serving fiction oriented category and readers.	A digital book is a result of collaboration by multiple people. Further, its lifecycle from creation and publishing to commercial processes is facilitated in digital space. Co-writing between authors is common in non-fiction category.	A digital book is a space for continuous exploration of the story. Storyline's past, present and future are available for the creation of new elements to listen and to play. The format has potential in book series and fantasy categories.
READER TYPES & NEEDS	GOURMAND	PRACTITIONER	ADVENTURER
	Intensive readers (Marshall, 2010) driven by meaning . They practice the interactive nature of reading (Rentola, 2003): "[After reading this book] now I want to google the places to go and look for books about Berlin on Amazon" (Reader R4).	Extensive and target oriented readers (Marshall, 2010) fluent with multiple formats. They want to be recognized as educated readers: "I contacted authors and pointed out an error in the concept that they had presented" (Reader R9) and often practice writing/blogging.	Ergodic readers (Aarseth, 1997) who continuously select between alternatives and want to influence on resulting reading experience. They "listen to literature and watch books" (Watson, 2010, 22) and have Pro-Am spirit (Leadbeater; Miller, 2004).

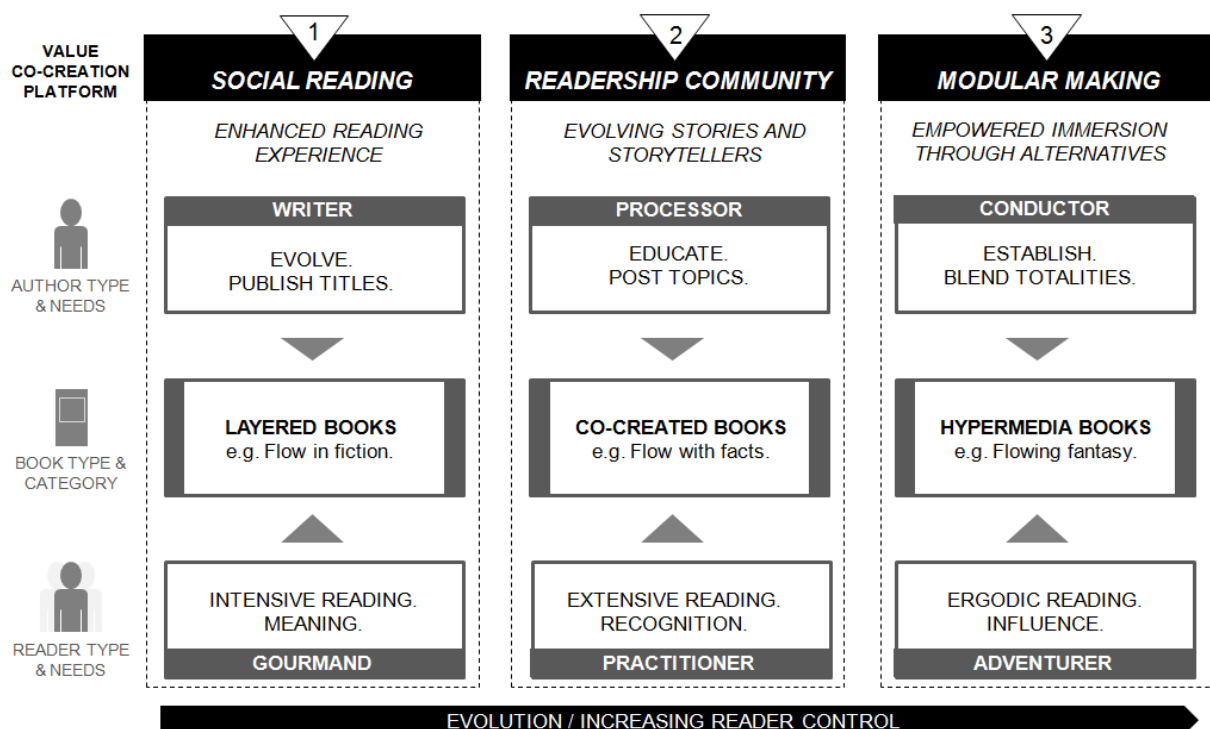


Figure 2. Three diverse value co-creation platforms in the digital era.

4.2 Platform 1: Social reading enhanced experience

The first value co-creation platform with social reading and layered book type responses to the challenge of grey literature. Digital book is a hub for “Title” related social objects and (commercial) services. The more there is new content creation and interaction, the more the “Title” gets attention, and its lifespan prolongs. Schultz Nybacka (2011, 72) argues that we need to understand both “how readers seek new texts and how texts seek out new readers”. The layered book type therefore confirms Drummond’s (2006) notion on that inspired readers want similar books and “google” more about the story related topics and the author (Reader R4). This relates to the interactive nature of the reading: “any text that is read is understood like a hypertext: it forms links, associations and connections to places that awaken images and needs in us” (Rentola, 2003, 32).

The greatest value of reading among fiction oriented “Gourmands” is reflecting the stories and understanding life, others, and self (Schultz Nybacka, 2011; Shankar, 2006): [The story got me to realize] “how lucky I am to be a woman living in Finland!” (Reader R5). According to Bianchi (2008, 244), people reflect cultural values (see also Thorsby, 2001; Van Der Ploeg, 2004) depending on their capability for “change, novelty, and self-renewal”. Furthermore, reading is social (Marshall, 2010). In a book group, for instance, other members influence how the book is read and interpreted as they are omnipresent in the individual reading experience (Shankar, 2006; Brown, 2006) which relates to the key tribal characteristic called “puissance” (a term coined by Maffesoli in 1996), meaning the energy and force of masses of people.

Layered book type, with social reading as the value co-creation platform, enables readers to link and create social objects, annotations (Marshall, 2010), and feedback related to the story serving the interactive and meaning-oriented reading culture. The value of reading enhances further with the social aspect of reading while other readers, author(s), and service providers create new content, services, and interaction layers for the story and for the book group. Social reading serves also “Writers” who want to get closer to their readers and receive feedback in order to evolve and grow as literary authors and brands (Author A6).

4.3 Platform 2: Community of evolving storytellers

The second value co-creation platform with readership community and co-created books reflects the already existing practice of co-writing. This collaboration can be initiated “either by surprising encounters or by joint research and analysis of the title portfolio together with publishers and peers” (Author A8). However, there is a growing need to facilitate the commercial process of storytelling and manage the story lifecycle: “It is quite understandable that publishers cannot endorse all of us writers in the sales, launches, and marketing of books these days. But what can I do on my own to cover the lack of resources?” (Author A4).

The readers can have multiple value creating roles in the creative and commercial processes. “Practitioners” in Pro-Am spirit (Leadbeater; Miller, 2004) can bring their skills and expertise in writing, illustrating, marketing, editing, or translating the story to other languages. There is no need to underestimate crowdsourcing practices, social media platforms and communities: Israel (2009) - the author of the book “Twiterville” - reports that Twitter users generated about three-fourths of the stories in the book. Furthermore, crowdsourcing can be harnessed to influence the forthcoming stories by voting favorites, proposing new “Topics”, or funding promising pilots with readers’ own resources and skills.

The most interesting value creating services from both the reader and author perspectives are the ones that facilitate and mentor recognition-oriented readers as storytellers and thus, reflect the growing number of semi-professional writers. Therefore, value co-creation opportunity can be realized through a readership community targeted to mentoring and training its members’ writing skills and thus, bringing forth new phenomena and talents.

4.4 Platform 3: Immersion through making

The third value co-creation platform with modular making and hypermedia books responds to common fear among professionals that the desire for intensive reading will eventually become marginal/niche (Marshall, 2010; Schultz Nybacka, 2011). The goal of hypermedia books and “Totalities” is to “give readers the freedom to choose among multiple options on how to read, experience and immerse in the story” (Expert E8) and to let “Conductors” to facilitate a story creation that “Adventurers” can “see, hear and play with” (Author A3).

The provision of options encourages also re-reading (Schulz Nybacka, 2011). Readers can influence their experience by changing the storyteller when they revisit the storyspace or by creating new experience elements together with the tribe of readers. The text defines and differentiates hypermedia from gaming and multiplayer online role-playing games (Funk, 2009). However, hypermedia is regarded a highly potential platform due to its gaming metaphor: “Very interesting and inspiring in the Finnish society that is focused on gaming and reading” (Expert E12).

Hypermedia book and its co-creation platform require enabling, user-friendly, and modular components, and lead user behavior: enjoyment and learning through making (von Hippel, 2005; Thomke; von Hippel, 2002). Moreover, it needs a pool of likeminded people (Kotler et al., 2010; Godin, 2008) who are inspired by the story and who service the members (Fournier; Lee, 2009) in the storyspace. Therefore, “Adventurers” are not only co-creators but they are

pioneers establishing a novel value creating network and have the greatest control of the reading experience compared to the previous platforms of social reading and readership community.

5 Discussion and conclusions

5.1 Theoretical contribution

This research focused on understanding value co-creation underlying digital services in the context of book publishing industry. As to findings, the study evidenced, concretized, and introduced three types of a digital book: (i) layered book, (ii) co-created book, and (iii) hypermedia book. Next, the study extended the role of contemporary authors towards the digital and social era as (i) writers, (ii) processors, and (iii) conductors, highlighting their unique needs and approaches to conventional publishing. Similarly, the roles of readers were extended from (i) gourmants and (ii) practitioners towards (iii) adventurers with their own motivations and reading cultures. Furthermore, this study placed digital book at the center of value co-creation between different types of authors and readers, and recognized three value co-creation platforms: (i) social reading, (ii) readership community, and (iii) modular making. Last, the study distinguished actors, content, and value co-creation for the purpose of digital service innovation, and integrated these findings in the novel framework showing three evolutionary and co-existing value co-creation platforms for digital era storytelling.

5.2 Managerial implications

For managers, this study addresses ‘rethinking’ as the key for understanding value creation in digital services. First, by freeing the traditional book from its format, and exploring the story elements from multiple perspectives – including service logic and user based approach presented in this study – provide an opportunity to prolong the story lifecycle, to discover new means for marketing, and to consider related price tags in the digital context. Second, the study encourages firms to move away from contradistinction (either-or) to co-existence (both-and) mindset when developing and designing user-driven digital services. The co-existence of different reading cultures and digital skills means that organizations can only bring value to people’s lives by understanding and supporting their resources, needs, and practices. Third, the starting point for digital service development might not be the technology-driven digital book and its format, but the understanding of value co-creation opportunities between authors, readers, and stories. By understanding the value creating opportunities, required value network partners can be identified to succeed in moving from digital transition to digital transformation. To summarize, the managers in the book publishing industry can utilize the key findings and the approach of the study for the purposes of (i) reflecting and redefining their strategic vision and assets, (ii) enhancing and modularizing the digital book and its lifecycle to enrich the reading experience and to capitalize on the story, and (iii) to develop co-creation and value co-creation motives and practices with value network partners, authors, and readers.

5.3 Limitations and further research

Every study has its limitations. Although extensive data were gathered from a number of actors and attention was paid in variety of respondents, this study calls for more research on the further possible types of authors and readers, and on value co-creation practices underlying digital services. The validation or prioritization of digital era storytelling presented here could be conducted in terms of the contemporary tendency among book publishing industry players to clearly separate non-fiction from fiction. However, it is hard to dissect the converging categories and new genres such as faction, infotainment, or edutainment. Thus, research on the categories is proposed to focus on story optimization in digital and traditional print contexts: What is the optimal production and publishing format for specific story types? What kind of competences and partners are needed in digital production and the related value network? What kind of criteria can be established for the value co-creation potential related to the story and supportive production platform? Further research should also focus on validating and identifying other digital book types, as well as digital era authors and readers for new opportunity identification for the book publishing industry.

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Appendix 1. Participants of the study

AUTHORS				READERS			
		TYPE	DATE			TYPE	DATE
A1	FICTION	WRITER	18.05.2011	R1	Age: 25+, FICTION	GOURMAND	JUL-AUG 2011
A2	FICTION, BLOOK	WRITER	03.06.2011	R2	25+, FICTION	GOURMAND	JUL-AUG 2011
A3	FICTION , 1ST BOOK	CONDUCTOR	07.07.2011	R3	35+, FICTION	GOURMAND	JUL-AUG 2011
A4	FICTION, 1ST BOOK	WRITER	08.07.2011	R4	35+, NONFICTION	GOURMAND	JUL-AUG 2011
A5	FICTION	PROCESSOR	11.07.2011	R5	35+, NONFICTION	GOURMAND	JUL-AUG 2011
A6	FICTION / NONFICTION	WRITER	12.07.2011	R6	40+, FICTION	GOURMAND	JUL-AUG 2011
A7	NONFICTION	PROCESSOR	14.07.2011	R7	40+, FICTION	GOURMAND	JUL-AUG 2011
A8	NONFICTION	PROCESSOR	19.07.2011	R8	40+, FICTION	GOURMAND	JUL-AUG 2011
A9	NONFICTION	PROCESSOR	08.08.2011	R9	40+, NONFICTION	PRACTITIONER	JUL-AUG 2011
A10	NONFICTION	PROCESSOR	18.08.2011	R10	45+, FICTION	GOURMAND	JUL-AUG 2011
B11	NONFICTION, SELF-PUBLISHER / BLOGGER	PROCESSOR	01.06.2011	R11	50+, FICTION	GOURMAND	JUL-AUG 2011
B12	NONFICTION, BLOGGER	PROCESSOR	21.06.2011	R12	NA, FICTION	GOURMAND	JUL-AUG 2011
EXPERTS			DATE	EXPERTS			DATE
E1	FUTURES SPECIALIST		25.05.2011	WP1	SERVICE DESIGNER		03.11.2011
E2	DEVELOPMENT MANAGER, BOOK RETAIL		27.05.2011	WP2	MASTER'S STUDENT , MEDIA		03.11.2011
E3	DEVELOPMENT MANAGER, BOOK RETAIL		27.05.2011	WP3	DEVELOPMENT MANAGER, LIBRARY SERVICES		03.11.2011
E4	FUTURES SPECIALIST		16.06.2011	WP4	ENTREPRENEUR, SOCIAL MEDIA		03.11.2011
E5	RESEARCHER, SERVICE DESIGN		14.07.2011	WP5	ENTREPRENEUR, DIGITAL BOOKS		03.11.2011
E6	PRACTITIONER, DIGITAL MEDIA		18.08.2011	WP6	RESEARCHER, SOCIAL READING		03.11.2011
E7	NICHE LITERATURE HOBBYIST		08.09.2011	WP7	DOCTORAL CANDIDATE, MUSIC		03.11.2011
E8	ENTREPRENEUR, DIGITAL PUBLISHING		09.09.2011	WP8	EXPERT, AUGMENTED REALITY		03.11.2011
E9	SPECIALIST, AUDIO & VIDEO		08.11.2011	WP9	PROJECT MANAGER, LITERATURE EXPORT		03.11.2011
E10	MEMBER, NONFICTION ASSOCIATION		30.11.2011	WP10	PROJECT MANAGER, MOBILE MEDIA		03.11.2011
E11	PRODUCER, MUSIC		01.12.2011	WP11	R&D, MUSIC AND AUDIO		03.11.2011
E12	ENTREPRENEUR, START-UPS		01.12.2011	WP12	COMMUNICATIONS MANAGER		03.11.2011
				WP13	PHOTOGRAPHER & VIDEO PRODUCER		03.11.2011
				WP14	EXPERIENCE DESIGNER, CHEF		03.11.2011

Ecosystem Business Models for the Internet of Things

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This study investigates ecosystem business models (“value designs”), in the context of the Internet of Things (IoT). Based on a literature review and data from a Delphi study and ten in-depth interviews, we show that as IoT companies transform focus from industry-specific applications to applications spanning over multiple industries, the challenges increase substantially. There is a need for changes in industry boundaries and service architectures, which will require developing value designs with the entire IoT ecosystem. Companies and customers are still searching for their roles, and the ecosystems lack many actors. Ecosystem view to business models helps to analyse IoT business models and challenges in building them.

1 Introduction

An increasing number of connected “things” create opportunities for fitting the digital and physical worlds together (Gershenfeld; Vasseur, 2014). This is because commonplace objects around us can be equipped with digital logic, sensors, and networking capabilities. For instance, the recent concept of Industrial Internet refers to integration of complex physical machinery with networked sensors and software to processes (Leber, 2012). Companies are able to use data collected from all kinds of objects, devices, and industrial machines to adjust and automate machine performance. Moreover, many applications will emerge on the consumer side. In this paper, we view that the Internet of Things (IoT) covers both the Industrial Internet and the consumer-oriented Internet of Things. New business models and methods are valuable for delivering services that can be developed through the IoT. Haller and colleagues (2009) define the IoT as a world where physical objects are seamlessly integrated into the information network, and where these objects can become active participants in business processes.

The IoT constitutes a significant potential both for companies and their customers to create new and/or better services, increase revenues or reduce costs, improve quality of processes, and generate new business models. For example, applying IoT information exchange and structures in hospitals, patients will get better and individualized care; in factories the manufacturing processes will become more efficient; all around us devices, vehicles, and machines will last longer with anticipatory maintenance; and traffic will become safer with exchange of weather or traffic information. The IoT bundles together diverse technologies and systems (Fleisch et al., 2009). According to Bucherer and Uckelmann (2011), networked infrastructure of the IoT enables both incremental and radical innovations and business changes and there are almost endless ways to utilize information, because the IoT enables pooling of resources.

Nevertheless, the full potential of the IoT has not yet been leveraged (Bucherer; Uckelmann, 2011), and the business promises of the IoT have not been realized. Previous literature on the IoT has emphasized technology and the business potential, but business models of the IoT have been discussed sparsely. In particular, there is a pressing need for research on the emerging IoT ecosystems from the business perspective (Leminen et al., 2012). Moreover, Westerlund and colleagues (2014) address the urgency to widen current business model studies from a single company point of view to an ecosystem perspective. Thus, this study investigates ecosystem business models, or as Westerlund and colleagues (2014) call them, “value designs”, in the IoT ecosystem context.

This study aims at increasing the understanding on how the business potential of the IoT can be seized, and how the “value designs” in the IoT ecosystems can be built. More specifically, our research questions are:

- What are the challenges and opportunities of IoT-based “value designs”?
- What are the current and future “value designs” of the IoT ecosystems?

The paper is organized as follows. After this introduction, we review previous literature on business models and ecosystems. Thereafter, we explain the methodology and discuss our key findings. Finally, we conclude by discussing the key implications for managers and to the theory, and provide avenues for future research.

2 Literature review

Research on business models has become increasingly popular since the late 1990s. However, literature on business models is still scarce with no commonly accepted view of what the definition of a business model should comprise (Morris et al., 2005; Osterwalder et al., 2005; Schweizer, 2005). According to Zott and colleagues (2011), the literature has viewed business models in many ways, including a statement, a description, a representation, architecture, a conceptual tool or model, a structural template, a method, a pattern, and a set. Moreover, business models are often studied without an explicit definition of the concept. Although there is no widely accepted definition of the concept, scholars have commonly agreed that the *business model of a firm* defines how the company operates in the market and how it creates value (Osterwalder et al., 2005; Rajala; Westerlund, 2008; Casadesus-Masanell; Ricart, 2010; Teece,

2010). Business models are often understood as consisting of components or modules. Shafer and colleagues (2005) identify as many as 20 business model components and categorize them into four main areas, while Osterwalder and Pigneur (2010) discuss nine distinctive business model pillars. It has also been argued that the business model thinking has changed lately. Achtenhagen and colleagues (2013) claim that there has been a change from ‘what business models are’ towards understanding ‘what business models are for’.

Scholars have widely agreed on that a business model is a firm level construct, but they also argue for the business model’s systemic nature (cf. Rajala; Westerlund, 2008). Tikkanen and colleagues (2005) emphasize the role of managerial cognition in the business model evolution, and argue that a business model can be conceptualized as a combination of company related material structures and processes and intangible cognitive meaning structures in the minds of people. The intangible structures of business models consist of belief systems – reputational rankings, industry recipes, boundary beliefs, and product ontologies – and those belief systems may act as constraints in firm’s business model development. Industry recipes express the persuasions of the management related to economic, competitive, and institutional logic of the firm. Boundary beliefs define the identity of the company with a certain inter-organizational community. Product ontologies link product or service attributes, usage conditions, and buyer characteristics into a hypothetically superior offering on the target market. Reputational ranking denotes the own performance of the firm related to its socially evaluated competition.

Zott and colleagues (2010) state that business models represent a unit of analysis nested between a single company and network levels, and they claim that business models help explain both value creation and value capture. Furthermore, Zott and Amit (2008) suggest the business model’s link with the business ecosystem. A firm’s business model is a system of activities dependent of each other not only through the focal company but also through the surrounding network (Zott; Amit, 2010). Hence, business models are linked with the principles of value chains and value networks, as well as business ecosystems. The emerging literature on business ecosystems also suggests the need for a deeper network view on business models (Muegge, 2013). However, it may be argued that the existing business model templates and frameworks are not well suited for analysing the interdependent nature of companies that are evolving in the same ecosystem, because they have been designed for examining the challenges faced by single existing organizations (Weiller; Neely, 2013).

The concept of *business ecosystem* was introduced by James F. Moore in 1993. It stems from the insight that innovative businesses cannot evolve in a vacuum, but they rely on different external resources – they need capital, partners, suppliers, and customers with which they create cooperative networks. According to Moore (1993), a company is – rather than a member of a single industry – a part of a business ecosystem that crosses many industries. Companies act cooperatively and competitively in a business ecosystem to develop and advance new products and to satisfy customer needs. In emerging technological fields, the members of an ecosystem also together create symbolic systems, technological artefacts, relational systems, and routines (Gustafsson, 2010). Thus, an ecosystem and its members coevolve and share a destiny. Furthermore, Westerlund and colleagues (2011) propose that by linking business models with the firm’s external strategy and relationships, researchers can characterize various business models and their differences in the ecosystem context. They (ibid.) emphasize that business model management is important especially when targeting the emerging markets and domains. Bucherer and Uckelmann (2011) stress that involving all stakeholders in a “win-win” information exchange is essential for designing IoT business models.

The IoT is about a large numbers of small and specialized “things”, i.e. devices and sensors connected (often wirelessly) to each other and to the Internet. According to Leminen and colleagues (2012), these “things” expand existing Internet applications and services and enable new ones. The IoT increases complexity of communications, and creates and requires increasingly adaptive technical solutions and technical components, as well as new roles. Leminen and colleagues (2012) also argue that the existing literature lacks sufficient understanding and empirical research on what IoT business models are and how they are connected to the underlying ecosystem. The authors (ibid.) also present a framework where they use infrastructure and customer dimensions to visualize a variety of existing and potential IoT business models and to distinguish four diverse IoT business model categories.

Considering the ongoing development of the IoT field, it is obvious that the ecosystem view is becoming more and more important due to actors’ interdependency through technical and business ties. Thus, Westerlund and colleagues (2014) suggest that managers need to shift their focus from the business model of a firm to ecosystem business models, which they refer as “value designs”. They distinct three interpretations of ‘ecosystem business models’: i) a business model with specific properties, or in other words, a business model anchored in ecosystem concepts (cf. Westerlund, 2013); ii) an ecosystem business model (or category of business models) shared by participants of an ecosystem (cf. Low & Muegge, 2013); and iii) a construct explaining how the entire ecosystem works towards common goals rather than how the firm-level business works (cf. Battistella et al., 2013). Following Westerlund and colleagues (2014), we understand these three interpretations as complementary views for understanding business models of ecosystems.

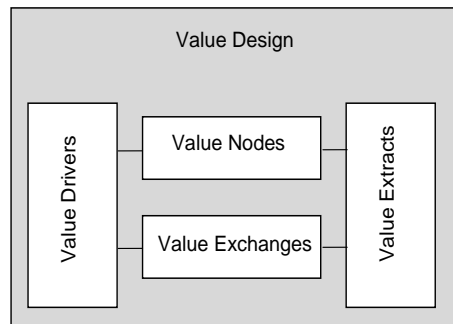


Figure 1. Key pillars of a business model design tool for IoT ecosystems (Westerlund et al., 2014, p. 11).

Westerlund and colleagues (2014) argue that there are deficits in the existing business model frameworks. According to them – besides concentrating on the firm level and not the ecosystem level – the current frameworks focus on the architecture of the business model, showing the “parts of an engine”, but not capturing the dynamics of the model, or “how the engine works”. Thus, they establish a foundation for a business model tool that considers the ecosystem nature of the IoT and focuses on the action instead of the parts. They (ibid.) also argue that because the term ‘business model’ predominantly focuses on a single organization’s business model, “value design” is better suited for ecosystems. The concept of value design illustrates how value is deliberately created and captured in an ecosystem. According to the authors (ibid.), the value design can be conceptualized by four pillars, i.e. ‘value drivers’, ‘value nodes’, ‘value exchanges’, and ‘value extracts’ (see Figure 1).

Value drivers express individual and shared motivations of diverse participants to fulfil a need to generate value, realize innovation, and make money. Especially shared value drivers are important in creating a non-biased, win-win ecosystem. Value nodes include various actors, activities, or (automated) processes, individuals, commercial and non-profit organizations or groups of such organizations, networks of organizations, or even groups of networks linked with other nodes to create value. Value exchanges (or flows) describe an exchange of value by different means, resources, knowledge, and information. Value extract refers to a part of ecosystem that extracts value. It shows the meaningful value that can be monetized and the relevant nodes and exchanges that are required for value creation and capture. Value extract enables to “zoom in” and “zoom out” in the ecosystem to focus on something beneficial for the business. Both a firm’s business model and any part of the ecosystem’s business model can be described with the value design, because value pillars are anchored in ecosystems.

Prior studies on IoT business models have identified versatile challenges in IoT ecosystems (Haller et al., 2009). Westerlund and colleagues (2014) identify the diversity of objects, the immaturity of innovation, and the unstructured ecosystems as challenges to design and monetize the IoT business models. *Diversity of objects* refers to the multitude of different types of connected objects with only modest standardization of interfaces; *immaturity of innovation* means that technologies have not yet matured into products and services, and *unstructured ecosystems* refer to that the participants and their roles are not yet clear in the emerging IoT ecosystems. The authors (ibid.) claim that it is possible to overcome these challenges and design successful business models by focusing on the ecosystem approach of doing business and using business model design tools that consider the ecosystem nature of the IoT.

The challenges presented by Westerlund and colleagues (2014) have certain parity with the managerial cognition perspective towards business model evolution presented by Tikkanen and colleagues (2005). However, Tikkanen and colleagues understand a business model as a company level concept and therefore also the main challenges being at the company-, or particularly managerial level, whereas Westerlund and colleagues emphasise ecosystem level challenges.

3 Methodology

3.1 Research setting and research design

We analysed 47 expert views on IoT business models via a Delphi study as well as in-depth interviews of 11 IoT experts in Finland. We chose the IoT as a research setting in order to contribute to the discussion on ecosystem business models, because emerging ecosystems offer a multitude of opportunities to explore business models and their challenges. Research design explains the path from data and methods to answer to the research questions. This study adopted a multiple-case study design with cross-sectional data from different industries to generate reliable evidence on the challenges and opportunities of business models in the IoT ecosystems. As suggested by Jensen and Rogers (2001) we deploy snapshot studies on cases. Halinen and Törnroos (2005) identify network boundaries, complexity, the role of time, and case comparisons in network research. Instead of focusing relationships between organizations in IoT ecosystems, we focused on case comparisons because each analysed case share similar elements, allowing us for typifying challenges and opportunities, as well as different value design pillars of business models in the context of the IoT ecosystems.

3.2 Data collection

The empirical data were collected from 2012 through 2014, comprising a three-round Delphi study to understand the IoT ecosystems and challenges in those ecosystems. Moreover, we used ten interviews with 11 participants representing eight key organizations in emerging IoT ecosystems to further understand value designs in cases identified in the Delphi Study. We focused on the core actors in the IoT ecosystems, because covering extensive networks requires a substantial amount of time and resources. The interviews were carried out face-to-face and varied between 60 and 120 minutes. The interviews were audio-recorded and transcript for the analysis. We followed an interview guide as suggested by Patton (1990) and collected information on various themes. We discussed with the informants to verify the key findings.

Besides the thematic interviews of Finnish IoT experts this study applied a three-round Delphi study investigating IoT business models. The Delphi study aimed at mapping Finnish experts' views on current and future IoT business models. The first round of the study was launched in early 2012, and the 3rd round took place in mid-2013. Participating experts represented versatile industry fields in Finland; i.e. telecommunication companies, electronics and other manufacturing, related research institutes, and so on. The Delphi method is a systematic, interactive forecasting technique, which relies on the panel and group discussions of experts and participants of the study. The method has been widely used for business forecasting and it has certain advantages over other forecasting approaches. Delphi is based on the idea that the forecasts or decisions originating from a structured group of individuals are more accurate than those from unstructured groups. This has been indicated with the term "collective intelligence". In the standardized Delphi study version, the experts answer to a questionnaire in two or more rounds. After each round, the facilitator summarizes the answers. (Rowe; Wright, 1999)

During the first two rounds of the study we asked the experts to provide case examples of current and potential business models in the IoT context, as well as challenges and success factors regarding these cases. After the 1st round the answers of the experts were summarized by the researchers into nine cases, and the purpose of the 2nd round was to further elaborate these cases and the opportunities and challenges of them. The summarized cases based on rounds 1 and 2 are presented in Appendix 1. According to our criteria, the summarized IoT cases 1) have IoT initiatives on IoT ecosystem, and 2) include several organizational actors involved in the development of a new product/service, a business concept, or social innovation based on IoT. The 3rd round of the Delphi study was more structured and focused on increasing our understanding on the features, success factors, and challenges of the nine cases. The 3rd round questions were structured so that we could analyse the results through classifying theoretical frameworks used in this study. In all of the Delphi rounds, we included open ended questions. By combining all the empirical material gathered with these different methods, we aimed at getting as deep understanding as possible on the new phenomenon and the logics behind new business formation in the IoT environment. Table 1 presents an overview of the empirical material used in this study.

Table 1. Overview of the empirical material of the study.

Delphi study			
	Round 1	Round 2	Round 3
Topics discussed	Description of case examples of current and future business models in the IoT context; open-ended questions	Elaboration of the cases summarized by the researchers; their challenges and success factors; open-ended questions	Likert-scale questions on probability of the cases, on challenges defined by managerial cognition, and on required networks, modularity, and customization in the cases
Amount of responses	20	9	18
In-depth interviews			
Topics discussed	IoT in general and interviewee's organization's aims and views regarding it. Description of the IoT ecosystem and its actors, tasks and activities performed by the organizations, and key challenges in IoT ecosystems.		
Person interviewed	<ol style="list-style-type: none"> 1. Manager, Multinational Telecom operator, 2012 2. Manager, Local Telecom operator, 2012 3. CEO, Local Telecom operator, 2013 4. Manager, Multinational Telecom operator, 2013 5. Manager, Multinational Telecom operator, 2013 6. CEO, Construction Company, 2013 7. CEO, Sensor Manufacturing company, 2013 8. Manager, Network Company, 2014 9. Researcher, Technology, Academia, 2013 10. CEO, IoT Service Developer company, 2013 11. Manager, Multinational Telecom operator, 2012 		

3.3 Data analysis

We organized the empirical data according to the informant, the date of interview, and the type of informant. First, we organized empirical material, the Delphi study and the interviews, to determine challenges and opportunities of the business models. The original transcribed interviews were analysed using a coding method by the researchers. The words associated with challenges, opportunities and business activities were searched by using the content analysis technique. Following Roberts (1997) and Neuendorf (2002) the aim of the coding and content analysis was to understand the cases. The empirical material was first coded by two authors, and later the identified challenges and business models were jointly compared, discussed and agreed by all the authors. In the second phase, a first round of coding described managerial challenges on business models and compared it to typology on Tikkanen and colleagues (2005). Third, we analysed opportunities of business models in IoT ecosystems. This involved a second round of coding using content analysis with the aim of understanding value linked to the business models in the IoT industry. The value designs were coded and compared with the four pillars suggested by Westerlund and colleagues (2014). Fourth, we investigated the value designs in the IoT ecosystems. At this stage, we analysed case-specific value design in detail, particularly from the point of view of the pillars suggested by Westerlund and colleagues (2014), i.e. value drivers, value nodes, value exchanges, and value extracts. After comparing our interpretations with prior research (cf. Westerlund et al., 2014), we identified previously unknown value designs and opportunities and challenges in IoT ecosystems. Fifth, we synthesized the results and concluded with characteristics of value design business models in IoT ecosystems. Table 2 gives an overview on our data analysis and the phases of the study.

Table 2. Data analysis process.

Data analysis phases	Task	Outcome
1. Open coding	<ul style="list-style-type: none"> Organize Delphi study and IoT expert interviews Identify main topics in each case 	Overview of expert views on IoT business models
2. First round focused coding	<ul style="list-style-type: none"> Identify and analyze challenges on IoT business models Compare data to theory 	Classification of managerial challenges on business models based on Tikkanen et al. 2005
3. Second round focused coding	<ul style="list-style-type: none"> Identify value designs on in IoT ecosystems Describe briefly value design in each case 	Mapping of four formerly identified pillars for value design (cf. Westerlund et al., 2014)
4. Identify value designs in IoT ecosystems	<ul style="list-style-type: none"> Analyse the business model related value design Identify value design over versatile industries Compare data to theory 	Mapping challenges to framework business model Detecting previously unknown value designs
5. Theorizing the codes	<ul style="list-style-type: none"> Synthesize phases #1-4 	Characteristics of value designs and business models in IoT ecosystems

4 Findings

This research aims at understanding business models or “value designs” for the IoT and their challenges in the emerging ecosystems. In this paper, our main theoretical starting points included the frameworks presented by Tikkanen and colleagues (2005) and Westerlund and colleagues (2014). We used these frameworks for analysing the empirical material and the existing and future IoT business models presented by the experts in our study. The managerial cognition framework on business models, originally presented by Tikkanen and colleagues (2005), helps to visualize managerial cognitions on business models for the IoT, while the framework by Westerlund and colleagues (2014) enables us to identify and understand the underlying value design – and therefore the firm-, network-, and ecosystem level challenges – in the development of new business models.

The Delphi study helped us to form nine cases on the IoT (cf. Appendix 1). The challenges of these nine cases were analysed via the managerial cognition framework by Tikkanen and colleagues (2005) on the basis of the third round of the Delphi study. We deepened our understanding on the challenges of building ecosystem business models via interviews. A breakthrough observation in our research (before we could proceed in analysing the IoT business models) was to realize that the interviewees were talking about challenges in building ecosystem business models at different levels. Thus, we have to pay regard to the level where the challenges are: are they at the level of a specific firm, its

network, or the emerging ecosystem? We maintain that in building business models for emerging ecosystems, the most critical challenges typically are not at the firm level, but at the ecosystem or network level.

Next, we will discuss our findings; first, we discuss challenges and opportunities in the nine Delphi study cases with the managerial cognition framework presented by Tikkanen and colleagues (2005) and more generally based on our in-depth interviews categorizing them at ecosystem, network and company levels; and, second, we discuss current and future value designs with three additional cases, or ecosystem extractions, based on our interviews with the value design framework presented by Westerlund and colleagues (2014).

4.1 Challenges and opportunities in building IoT value designs

During the first two rounds of our Delphi study, we asked the experts to provide case examples of current and potential business models in the IoT context, as well identify challenges and success factors in these cases. Their case examples were summarized into nine cases. Appendix 1 provides a brief summary of all nine cases retrieved from the experts in the Delphi study. The third round of the Delphi study focused on further inspection of the challenges in the cases and relied on the managerial cognition perspective to business models suggested by Tikkanen and colleagues (2005). We asked the experts if the nine cases would require changes in industry boundaries or operating models (testing industry recipes), in product/ service architectures or structures of the participating actors (testing product ontologies), in the partner or customer base of the participating actors (testing boundary beliefs), or, if the current position/ reputation/ brand of the participating actors would limit their potential in the cases (testing reputational rankings).

Our analysis of business models from the managerial cognition perspective suggests that the most likely challenges in all cases are changes required in industry boundaries or service architectures. Changes in industry boundaries would be needed very likely in five of the nine cases, and changes in service architectures (product ontologies) would be needed very likely in four of the nine cases. Building new IoT-enabled services, such as services for elderly people living in their homes, will require cooperation with actors from many different industries, and very likely also making significant changes into operating models and industry boundaries of these industries. Also, there is a need to develop completely new service architectures for services that span over multiple industries. A summary of all the answers based on the managerial cognition perspective suggests that the most challenging case – according to the experts' views – is health related products and services. It has challenges in all the four areas of managerial cognition perspective on business models (cf. Table 3).

Table 3. Challenges of the Delphi study cases according to the managerial cognition perspective (Tikkanen et al., 2005) (xx – very likely, x – rather likely).

	INDUSTRY RECIPE: industry boundaries	PRODUCT ONTOLOGY: service architectures / structures	REPUTATIONAL RANKING: position/ reputation/ brand	BOUNDARY BELIEFS: partner/ customer base
1.Traffic Data Marketplace/Databank	xx			
2.Food security tracking system			x	
3.Real-time waste management		x		
4.Health related products and services	xx	xx	x	xx
5.Health guidance service	x	xx		x
6.IoT-adapted manufacturing processes	xx	x		
7.Electronic shopping assistant				
8.Home owner's digital service to monitor and manage facilities	xx	xx		x
9.Saving energy	xx	xx		xx

Our Delphi study suggests that there is a trend of moving from closed, private cost reduction- and efficiency-driven ecosystems towards open, horizontal and networked value adding ecosystems and business models which are spanning over multiple industries (see also Leminen et al., 2012). Moreover, our interviews support these views. When asked about the opportunities of the IoT, the experts mentioned that previously separate industries like health services and housing may be able to offer joint services related to smart home services based on the IoT technologies.

“When services are seen from the consumer's point of view, the same service may include many services from different industries, such as bank, government, and shopping services. In the future, there will be more multi-

sectoral services. If we think too narrowly, we would leave out perhaps the most potential services.” (Manager, Network Company, 2014)

Based on our Delphi study, we found that the challenges are significant, as firms aim at transforming from vertical, industry-specific IoT applications to horizontal applications spanning over multiple industries. Major changes especially in industry boundaries and product and service architectures will be needed. Therefore, we will discuss the challenges raised in the Delphi study and interviews from the value design perspective, and categorise the challenges at the ecosystem, network, and company levels, and thereby “zoom in” and “zoom out”, as Westerlund and colleagues (2014) suggest. In the following section, we present three cases, or ecosystem extractions, to illustrate how the analysis of ecosystem business models can be done using the value design framework presented by Westerlund and colleagues (2014).

When asked about *ecosystem level challenges*, the experts mentioned that – at least in Finland – for the time being there are only isolated actor- or industry-specific incremental innovations in the IoT field, with no clear killer applications or dominant designs or standards. There are lots of small applications that fail to work together. Some of the experts suspected that IoT services will be fragmented by nature, because the customer needs are and will become more and more fragmented. Also standardization of service interfaces, which will be needed in the IoT field in addition to technological standards, will be far more difficult than standardization related to physical things. Although there are publicly funded projects in Finland related to the IoT, proper ecosystems have not yet been formed. Some respondents argued that there is not enough trust among actors; that there are missing actors in the emerging ecosystems, and that there is need for intermediaries who would discuss with potential ecosystem actors and their customers on possible IoT solutions. Many respondents emphasized that the only way to bypass this deadlock situation would be to get concrete pilot projects up and running. These would also concretize the benefits of the solutions for the potential customers. Some respondents wished for new legislation that would force the development of new commercialized IoT innovations, i.e. being value drivers for the IoT ecosystem (e.g., road tolls, stricter rules on food security, energy consumption, or eco-efficiency).

Regarding the more general ecosystem level challenges, the experts mentioned that in some industries there are factors that may slow the development down; for example, the dominance of incumbents, such as ICT or device suppliers, or fragmented structure of the market, or regulation that creates barriers for entering the market. Our Delphi study indicates that developing IoT-enabled solutions for the health sector will face many challenges, and the interviews strengthen this view. The health sector has all the factors mentioned above, namely strong incumbents, fragmented market, and strict regulation, and the experts found it as a particularly challenging, although interesting field. Health-related solutions are difficult to advance because the customers are often public institutions – which are not always considered to be agile or eager to invest or change their partners, or to take new technology into use – and there are many restrictive regulations, which also vary from country to country and sometimes even from city to city.

“As to the IoT, there is not an actor or role of a system integrator, a mediator who would discuss with customers.” (Manager, Network Company, 2014)

“The companies want to focus on their own issues, and this is a major challenge. We have to make somehow them share information and experiences, and form ecosystems.” (Researcher, Technology, Academia, 2013)

“It is unclear who would be interested in driving standardisation in for example health care sector.” (CEO, Sensor Manufacturing company, 2013)

“In elderly care efficiency and cost savings are critical issues in the near future... New business models and service concepts will certainly be needed.” (CEO, Sensor Manufacturing company, 2013)

“Regulation in the public sector makes it fragmented, and it is very difficult to develop services or to get customers there.” (CEO, Local Telecom operator, 2014)

According to the experts, the actor who gathers the data would be the most viable choice for managing the IoT **network**. However, the data must be opened so that several actors have possibility to receive and refine the data that is gathered with the help of the IoT technologies. The actors have to be able to step out of their current roles and develop new services with new partners, including customers and end-users. In order to succeed, the IoT business models need to take account and motivate all actors. Networking and offering wider total solutions with partners is of importance. It is also crucial that the end-customer understands the benefits and wants to pay for the products or services; only this makes mass-markets to come true.

“People understand technology better today. This makes it possible to involve them more in developing services. Customers and end-users should be involved.” (CEO, Sensor Manufacturing company, 2013)

“The actors are stuck into their present roles. They do not see the end-user behind their own customers. The entire value chain should get involved into developing services.” (CEO, Local Telecom Operator, 2014)

Commercialization and networking are considered major challenges for *companies* in Finland. This was emphasized also in the experts' opinions: there is a strong belief among Finns that the Finnish people are good at technology but worse in turning the technology into commercial success. An important point is that the old organizational structures or operating models do not change easily into IoT-enabled models. In the companies, it is nobody's business to develop IoT solutions, there are no incentives to sell them, IoT solutions are not easy to sell because they are not off-the-shelf products, and neither the seller nor the buyer knows what the benefits are of using the IoT. Moreover, as in any ICT or automation solution, business customers are afraid that they will lose their jobs if they buy them. Although the interviewees saw biggest potential of the IoT in new cross-industry services and value creation, a bit surprisingly, among the most common drivers of IoT at the company level were generally mentioned efficiency (including energy efficiency, cost efficiency, efficient production of services, etc.).

"IoT will have a breakthrough only when and if people get clear and concrete benefits." (Manager, Multinational Telecom operator, 2013)

"Communication failures between organizations and within organizations are the reason why innovations do not get commercialized and spread." (CEO, Construction company, 2013)

Based on the situation in Finland, we conclude that congruent to the arguments by Westerlund and colleagues (2014), there are versatile challenges at the ecosystem-, network-, and company levels, and related to unstructured ecosystems, immaturity of innovation, and the diversity of objects (and customer needs).

4.2 The current and future value designs of the IoT ecosystems

In this section, we will further study the value designs for IoT ecosystems, and present three cases, or ecosystem extractions, based on the in-depth interviews. We will employ the value design framework suggested by Westerlund and colleagues (2014) for analysing business models in the ecosystems.

Development of new IoT-enabled business models in the telecom operator industry

The first extraction of an ecosystem illustrates the use of the framework in describing the potential changes in telecom operator industry due to development of new IoT-enabled business models. The extraction covers three different value designs in the ecosystem. The pillars of value designs consist of *value drivers*, such as offering value-adding services or aiming at efficiency, *value nodes*, i.e. actors and resources in the ecosystem, *value exchanges*, such as money and service flows, and *value extracts* which describe the level where the current description of value design is focusing or "zooming" (cf. Table 4).

Some interviewed experts in the operator industry perceived the IoT as 'business as usual' for their company, as machine-to-machine solutions have been around since the 1990s. However, most of them viewed at least some seeds of possible disruption in their own networks due to the global nature of the IoT business or in the birth of global IoT actors (e.g. Jasper Wireless offering global SIMs). As Audi or other manufacturers aim at getting into direct contact with the end-users and bypassing delivery channels by assembling e-SIMs into their products, telecom operators will face both new opportunities and competition, because e-SIMs are not proprietary for a single operator and the customers will be able to easily switch their IoT operators. Both local and multinational operators we interviewed regarding their *value drivers* for getting into IoT business viewed that they want to offer value-adding services for their customers and guarantee efficient use of existing telecom networks. The local telecom operator emphasized offering IoT-based services which make their customers' lives easier and provide them with better customer experiences. As for *value nodes*, both local and multinational operators want to build IoT solutions together with partners. In particular, they want to find smaller firms who develop IoT services in close cooperation with the customers. However, there are missing actors in the emerging networks. The local operator pursues for a role as a local business developing company and, therefore, aims at working with local partners. They are especially interested in offering services for municipalities, although they see that working with those municipalities brings forth many challenges. In the IoT field, there will be also global actors who will act according to their own logics and rules. There is a challenge in the home environment for the local and multinational operators that the IoT increases traffic in the telecom network if people make their own IoT systems or buy IoT services from global actors such as Google or Apple. However, the telecom operator is the one who has to keep its network customers happy and make investments to increase the network capacity, and the challenge is how they will get earnings out of these investments.

Table 4 presents the global telecom operator business model from the perspective of a company using its services. For the companies using services of global operators the benefits, or *value drivers*, will be place independency, global coverage, bypassing supply chains, and being able to offer value-adding services for their customers. A challenge is that it is difficult for the companies to know what the winning technology or who the winning actor will be in the IoT field.

Development of IoT applications for sustainability-based business models

The second extraction on the IoT ecosystems is a company-driven model. For the small company developing IoT applications the *value drivers* are offering services for measuring and calculating energy consumption and ecological

footprints of buildings. For the real estate owner buying these services the *value drivers* are sustainability, and cost- and eco-efficiency. There are challenges in building ecosystem business models for these sustainability-based services at the IoT developer company level related to the *value nodes* – for example finding right pilot customers and partners, and developing suitable algorithms for calculations. In addition, there are challenges at the network level – especially for the telecom operator company whose *value drivers* are building a bundle of sustainability related services or a bundle of real estate services; the operator faces the challenge of missing actors (i.e. *value nodes*) as there are not enough promising IoT service developers. Also at the ecosystem level there are challenges like ownership and opening of the data – if or not the data is available for building the necessary benchmarking databases (which are ecosystem *value nodes*), or if or not there are standards that make it possible or easier to design these kinds of services (which are ecosystem *value flows*). Seen at different levels of the ecosystem or from different actors' perspectives also value designs, including value drivers, value nodes, and value exchanges, may be slightly different. However, an individual actor confronts the challenges at all levels of the ecosystem – the pains are shared, or as one of the interviewed experts put it: “*We all have the same challenges.*”

Development on bottom-up models for the IoT

The third extraction illustrates bottom-up models of the IoT. In big companies there are certain inertias preventing innovations that in case of the IoT could be overcome with emergence of bottom-up IoT-developer and user communities. The experts we interviewed mentioned some examples of bottom-up models; for example after the disaster at the Fukushima nuclear plant a group of citizens organized radiation follow-up with their own sensors and published their observations in the Internet besides the official follow-up organized by the authorities. Other examples referred by the experts are weather detection networks, e.g. Blitzortung or Lightningmaps (www.blitzortung.org, www.lightningmaps.org), which are communities of volunteers: station operators who transmit their data to the central server, programmers who develop and/or implement algorithms for the location or visualization, and people who assist to keep the system running. These networks consist of several inexpensive lightning receivers and one central processing server, where the stations transmit their data. The *value drivers* for an individual person involved in these kinds of bottom-up models can be tapping into trust-worthy information services cost-efficiently. This means that users may share their own expertise and knowhow and become producing actors (Fleisch, 2010; Kortuem et al., 2010).

Table 4. Three extractions on value designs in the IoT ecosystems

#	Type of business model	Value drivers	Value nodes	Value flows /exchanges	Value extracts	Challenges
1	Network connections and value adding services for local customers (Local telecom operator)	Value-adding services, efficient usage of existing network	Local telecom operator and its partners and customers (businesses, consumers; public sector, municipalities)	Information, service and money exchange between the telecom operator and its customers (also between the customers), network service	Network	Finding partners, getting public sector customers/ partners, getting fair compensation of network investments
	Network connections and value adding services for customers in target countries (Multinational telecom operator)	Value-adding services, efficient usage of existing network	Multinational telecom operator and its partners and their customers	Network service, money exchange, service provided by partners	Network	Finding partners, getting fair compensation of network investments
	Network connections and value adding services for customers globally (Global telecom operator)	Place independency, global coverage, value-adding services for customers, bypassing supply chain	The company and its customers, the telecom operator	Information, service and money exchange between the company and its customers	Company using the service	Relying on a winning technology and actor
2	Sustainability for real estates	Value-adding services for real estates	IoT developer company, customers (real estate owners), telecom operator; databases, algorithms	Information, service and money exchange	Ecosystem	Is the data open? Are there standards?

#	Type of business model	Value drivers	Value nodes	Value flows /exchanges	Value extracts	Challenges
	Value adding services for sustainability or real estates (Local telecom operator)	Creating bundles of value-adding services, efficient usage of existing network	Telecom operator and its customers	Information, service and money exchange between the telecom operator and its customers (also between the customers), network service	Network	Finding partners, getting customers
	IoT service developer	Measuring and benchmarking eco-efficiency (footprint)	Company and its customers (real estate owners), databases, algorithms	Information, service and money exchange	Company developing the service	Developing algorithms, finding partners, getting pilot customers; Who owns the data?
	Real estate owner	Sustainability, cost- and eco-efficiency	IoT service developer/ provider, telecom operator, company and its customers (home owners)	Information, services for home owners, money exchange, brand value	Company using the service	What are the benefits?
3	Bottom up models	Tapping into trustworthy information services cost-efficiently	Individuals producing and consuming, possibly a roof organisation	Peer-to-peer information, central database, payments for devices, programming, visualisation etc. work	Individuals co-producing and using the service	Getting fair compensation of work and investments

5 Conclusions

This research aims to increase understanding on the business models, or “value designs”, of the IoT ecosystems, and the challenges that are faced in building them. In this paper, we showed that designing and analysing business models for the IoT ecosystems require new methods. We presented value designs of three ecosystem extractions with the value design framework by Westerlund and colleagues (2014). The analyses show that there may be many value designs at the same time also in the same ecosystems, and they may coexist. For example the analysis of the telecom industry with the value design framework helps to understand the value drivers, value nodes and value exchanges of different actors and at different levels, as well as, challenges that are confronted in building IoT-enabled ecosystem business models. Both a firm’s business model and any part of the ecosystem’s business model can be described with the value design.

There are three key findings in this research based on the Delphi study, interviews and our analyses above, and they are the following.

There is a trend towards open horizontal IoT applications spanning over multiple industries

According to the Delphi study and interviews of the IoT experts, there can be seen attempts from vertical industry-specific applications towards open horizontal IoT applications spanning over multiple industries, but challenges are still considerable. Today numerous incremental innovations exist, but they are actor or industry-specific and lack working together. Our analysis based on managerial cognition perspective originally presented by Tikkanen and colleagues (2005) showed that building business models that employ opportunities created by the IoT will not be possible without changes in industry boundaries and service architectures. Also according to our Delphi study and interviews, there are a lot of challenges in building business models for IoT-enabled horizontal applications, and they can be classified at ecosystem, network and company levels following Westerlund and colleagues (2014).

Both companies and the customers are still searching for their roles, and the emerging ecosystems lack many actors

Presently, although there already now might be enough awareness on new market opportunities created by the IoT among relevant actors, there is no pressure from the potential customers, because both the business users and consumers seem to be wondering what the application areas and the concrete benefits from emerging IoT technologies would be. We assume that the first killer IoT applications will be rather limited, but revolutionary enough for constituting clear proof for the benefits. So to say, “*the proof of the budding is in eating*”. The global nature of the IoT may bring forth powerful new actors or user-centric bottom-up development models, and therefore possibilities for disruption. Based on our observations, the IoT experts are becoming aware that the barriers for change will not be overcome without increased networking and cooperation with partners, including potential customers and end-users. However, several actors and particularly intermediaries are still missing in the emerging ecosystems. Also deeper service thinking is needed. End-users should be activated more in developing new innovative services. The managers are aware that

solutions will require developing and piloting services and their business models together with the entire IoT ecosystem. It is not possible to build sustainable business models without moving from fragmented to systemic view on business models, applying the stakeholder win-win approach, and utilizing business model frameworks that take into account the whole ecosystem.

Ecosystem view to business models helps to analyse IoT-based business models and challenges in building them

As discussed earlier in this paper, the majority of business model literature considers a business model as a company level concept, and therefore an implicit assumption is that, also the challenges at building new business models would lie at the company level. However, we argue that the major challenges in emerging technology fields and in emerging business ecosystems, such as the IoT environment, do not lie at the company level, but at business network or ecosystem levels. It is challenging to design business models based on new radical technologies, because the technologies have not yet matured into products and services, and the actors and their roles are not yet formed in the evolving IoT ecosystem (cf. Westerlund et al., 2014). Therefore this study proposes a need for instead of focusing on a company-related business models to more widely sketch ecosystem-wide business models. With case examples of ecosystem extractions we have shown that the “value design” perspective presented by Westerlund and colleagues (ibid.) is useful in the IoT context. Applying their (ibid.) value design framework enables us to define the characteristics of the ecosystem at different levels of it with value design pillars – value drivers, value nodes, and value exchanges – and focus and classify challenges at different levels of the ecosystem by “zooming in” and “zooming out” with value extracts.

The theoretical contribution of this research is increased understanding of how business models can be created in emerging technological fields, such as the IoT environment. For managers, the study illustrates how a novel tool developed by Westerlund and colleagues (2014) for designing IoT-enabled business models in an ecosystem can be used. The results enable managers to route on business model design by focusing on industry-specific or cross-industrial opportunities in an ecosystem.

There are always limitations in research. In this study, we presented the first attempt to analyse ecosystem business models with the “value design” tool for the IoT ecosystems. The data covered emerging IoT ecosystems from the Finnish perspective, in early stages. In other words, the IoT ecosystems are about to emerge and develop, whereas the ecosystems do not have all stakeholders or the stakeholders may change. Acknowledging these limitations, this study calls for more research on IoT-enabled business and value designs in IoT ecosystems. There are ample research gaps related to IoT business models, because generic business model research frameworks have challenges in dealing with emerging ecosystems as the IoT (Westerlund et al., 2014). There are almost endless possibilities to connect a thing, a business, and a consumer together, which makes it virtually impossible to invent a particular “killer” business model (Leminen et al., 2012). Ecosystem business models should be studied more in the future. To sum up, there is need for more research and understanding on ecosystem-wide business models, the roles of actors in ecosystems, and the dynamics of emerging ecosystems, where different industries and clusters are in process of integrating into a larger ecosystem, as in the IoT. The frameworks and methods presented and tested in this paper constitute first attempts to show how ecosystem business models can be analysed.

Following Westerlund and colleagues (2014) an interesting future research topic is how the growing need for the IoT will effect on business model designs more generally. Leminen and colleagues (2012) attempt to distinguish IoT-enabled business models in one industry. Business models crossing various industries are increasingly emerging. Thus the IoT and its value designs have a potential not only to radically change the business, but also our mental models and our ways of thinking about business. More specifically, new research questions may be articulated: how the growing need for the IoT will effect on the value designs of ecosystems; how will this reflect to value designs on IoT-enabled ecosystems particularly.

APPENDIX 1.

Nine cases created based on the experts' answers to the Delphi study, their descriptions and challenges.

	Case	Description	Challenges mentioned
1	Traffic Data Marketplace/Databank	Real-time traffic, environment, weather, condition, incident, etc. related data collected from all possible sources, both public and private. Data collectors, data storages, value added service providers and developers can use the collected data on commercial bases to build end-user services. The customers are value-added service providers (paying for the "raw data") and the users of their services/products.	There should be a focal actor, "marketplace owner" that takes care of data storages and interfaces to/from the storages. Stakeholders are competing of the driver's position in the value chain. Commercial model is pretty challenging / unclear. Proper business models are needed, as well as standards.
2	Food security tracking system	Trace of food products from original material providers to consumers. This model needs to involve multiple IoT service providers. The actors could be for example food manufactures, food vendors, importers, exporters, retailers, standardization organizations, government authorities.	In this system, an international steering group or actor will be needed to take care of the network. Requires many parties and especially international standardization, governmental and other authorities to agree. This model needs to involve multiple IoT service providers.
3	Real-time waste management	Real-time waste monitoring and management uses sensors to reduce the costs of waste collection. Customers will be waste management companies. Those who are paying for waste collection (both private and businesses) may also benefit from reduced costs of waste collection. The technology is likely to be proprietary, potentially using commercial off-the-shelf (COTS) components. The focal actor is a waste management company, or its spin-off. The supply network shall include component providers, communication module providers, communication network providers, solution providers, and an integrator.	
4	Health related products and services	The model is based on sensors and IoT communication infrastructure together with medical expertise. Health is primary need for all the population, and that is why everyone is and will be customers. The model improves quality of life, and reduces sicknesses and costs of health services. Government and public health institutions should trigger the deployment and awareness in the population. Private companies can offer tailor made services and applications for wealthy people.	Issues with standardization, legislation. The need, solution and business case have to be addressed more thoroughly. Too many roads to go - dispersed or overlapping technologies and applications.
5	Health guidance service	Health guidance service can be offered for young and middle aged people. Sensors monitor key parameters and these are analyzed by medical experts. Users will receive warnings on certain parameters and proposals how to improve health status. Technologies for these products and services are sensors and IoT connectivity. Earning comes from private services that provide specific information and additional checkpoints that can be performed with medical experts.	
6	IoT-adapted manufacturing processes	Situation-aware smart machines and robots in manufacturing lines can customize products during the production process. This is cheaper, more flexible and there is less need for human interaction. This also enables decentralization of business processes. Cost savings can be gained, because efficient production lines require fewer employees. Higher average production output generates more revenue. The customers are owners of production lines, warehouses, automated storage facilities or similar. Systems need to be setup by b2b partners, so b2b channels are used to reach customers. Focal actors are producers of smart supply chains and robots or machines for supply chains.	Challenges include high investment costs and interoperability of production line elements with existing IT environment. If used technologies are not be standardized, this causes problems when integrating new machines from other vendors (vendor-lock!).
7	Electronic shopping assistant	Customers are anyone who goes shopping. By pointing on a particular product, key information about this product is listed: price per unit, production/expiration date, ingredients, calories, country of origin, "green information" (emissions etc.), alternative products, cheapest price in surrounding supermarkets, etc. Customer benefits are fast, transparent, reliable and independent information, customized warnings (for diabetics etc.), money savings, healthy and environmentally friendly products. Technology needed is data warehousing, sensor data, and reader devices for users. Focal actors are supermarkets, governments or the WHO (world health organization).	Challenges include high costs of establishing product information system and gathering data. Model is not doable without legislation. Electronic shopping assistant, if understood as "warehouse logistics applied to home icebox etc." does not seem credible, people do not want it (for now at least)
8	Home owner's digital service to monitor and manage facilities	The service would be provided based on plug-and-play devices and access points available to the customer as an installation package. Open and user-friendly applications would be provided, and a possibility to pool services in the neighborhood area, if so wished for example during vacations. The service operator would be a central stakeholder. No expensive built-in technologies would be required and therefore construction companies do not play a role in the business. Still, a version of the service could be directed to publicly owned properties, expanding the present security and maintenance services.	Cost vs. willingness to pay; users technical competence.
9	Saving energy	By measuring temperature with sensors it is possible to decrease energy consumption.	Issues with standardization.

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Servitization and Sustainability in the Italian Manufacturing Firms

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The following is a working paper that aims to analyse two key trends of the modern economy: the Servitization and the Sustainability related to the competitiveness and the survival of the manufacturing firms. Specifically, the main research question of this work is: "What is the situation of the Italian manufacturing firms – both individually considered and compared to EU manufacturing firms average – respect Servitization and Sustainability concepts?". In order to answer the research question, the secondary data analysis has been chosen as the research methodology.

1 Introduction

The last decades are being driven by two key trends: on the one hand Services and on the other hand Sustainability.

We can look at these phenomena as a "new industrial revolution", particularly important for the manufacturing firms, where they could be considered in a circular relationship.

The latter, in fact, in order to stay alive in the current competitive environment and to defend themselves against competition (Santamaria et al., 2012), get closer and closer to the services world, and to the Servitization strategy in particular, thus offering no more than "just" a tangible product, but a *solution* (i.e., a combination of product(s) and service(s) in a single package). These solutions offering has also encouraged the manufacturing industry to approach the renewed needs of sustainability (economic, social and environmental) of its production process in order to better meet the global environmental challenges. The switch towards better environmental performance, manufacturing firms need to apply a more integrated approach, between products and services, often referred to as Product-Service System (PSS).

The importance of both these concepts is particularly acute at the European Union level.

In this vein, we can consider, in particular, two OECD reports. The first one, entitled "*Eco-Innovation In Industry: Enabling Green Growth*" (2009), said that manufacturing firms "have the potential to become a driving force for realising a sustainable society by introducing efficient production practices and developing products and services that help reduce negative impacts. This will require them to adopt a more holistic business approach that places environmental and social aspects on an equal footing with economic concerns". It is possible to describe this process through the term *Eco-Innovation*, that "can be generally defined as innovation that results in a reduction of environmental impact, no matter whether or not that effect is intended". Figure 1 provides a description of the steps that a company must address in order to be sustainable.

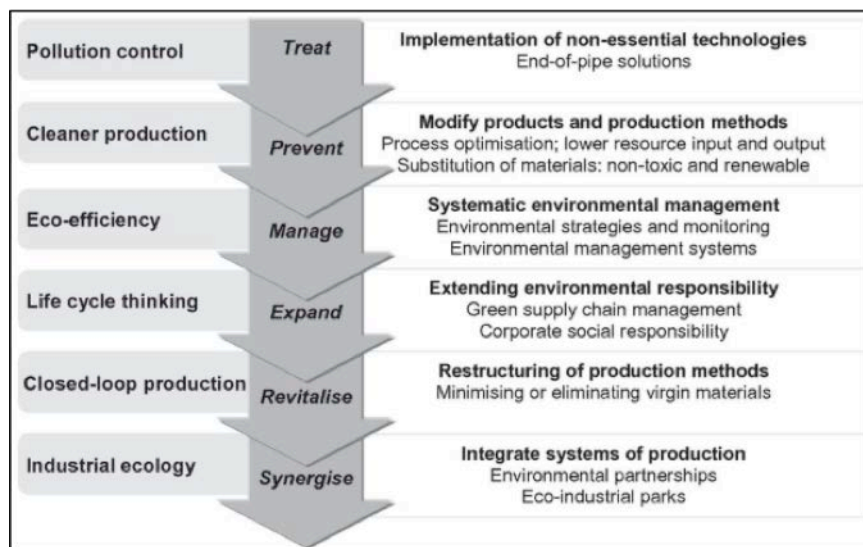


Figure 1. The evolution of sustainable manufacturing concepts and practices.

Source: OECD Report, 2009.

The second OECD report, titled "*Manu-services: best of both worlds*" (2011), states that more and more manufacturing firms combine products and services into a single offer, becoming service providers (Lay et al., 2010). The term "manu-services" describes this combination and represents "a broad group of activities that involve combining manufactured goods with services. These activities range from fairly simple combinations of goods and complementary services (such as maintenance and installation) to complex integration of manufacturing and services (which may involve providing services such as development, design and after sales care in close integration with the production of a good) [...] but

manu-services are complicated activities, which require firms to coordinate fundamentally different skills. Manu-service firms – especially smaller firms – face a range of challenges and barriers to growth". In effect, it is a shift that requires to manufacturing firms to change their strategies and to develop new business concepts (Neu and Brown, 2008).

Moreover, services are the main source of job creation across the OECD area, and in the EU-28 the contribution of services (as the sum of the value added by activities such as: financial, insurance, accommodation, business service, etc.) to the gross value added was 73.0%, while that of industry was 19.3%. Focusing specifically on Italy, the contribution of services was 73.7%, a similar percentage to the average of the EU-28 (OECD Factbook, 2014).

2 Theoretical framework

Thus, if manufacturing companies of our time want to continue to operate in the market must therefore take into account the two above-mentioned trends: *sustainability* and *services* (in particular the *servitization* aspect).

Both topics have been studied a lot over the last few decades, but for the purposes of long-term survival of manufacturing firms they must be treated together, both at theoretical level – by researchers, and at practical level – by managers belonging to the manufacturing firms.

Thanks to the numerous studies on the two topics under analysis, it is possible to identify five common points (see Table 1) between servitization and sustainability practices.

Table 1. Common points between Servitization and Sustainability.

COMMON POINTS	SERVITIZATION	SUSTAINABILITY
BE COMPETITIVE	<ul style="list-style-type: none"> Manufacturing companies are also beginning to realize the strategic importance of servitization in gaining a competitive advantage (Lin et al., 2014) The debate about services-led competitive strategies continues to grow, with much interest emerging around the differing practices between production and servitized operations (Baines et al., 2011) 	<ul style="list-style-type: none"> Manufacturing organizations adopt sustainability manufacturing in their attempt to address the triple-bottomline (TBL): environmental stewardship, economic growth, and social well-being (Ocampo and Estanislao-Clark, 2014) Design for sustainable manufacturing enterprise (DFSME) is considered to be a new ideology regarding survival of manufacturing enterprise and it can also be considered as one of the most important solutions to deal with the existing global financial crisis (Garbie, 2013)
BE INNOVATIVE	<ul style="list-style-type: none"> As manufacturing businesses operate in an ever more competitive, global economy where products are easily commoditized, innovating by adding services to the core product offering has become a popular strategy (Visnjic Kastalli and Van Looy, 2013) The term servitization refers to innovation in company's capabilities to shift from selling of goods to selling of products and services that deliver value in use (Baines et al., 2009a) 	<ul style="list-style-type: none"> Assessing and selecting the optimal technological alternatives in industrial sector is a fundamental tool to improve and adapt the industrial processes to the European legislation, which encourages the incorporation of new technologies for minimising the environmental impacts of companies such as Best Available Techniques. (Ibáñez-Forés et al., 2014)
ACQUIRE NEW KNOWLEDGE	<ul style="list-style-type: none"> This company added higher-valued service to their original specialty in the business, transforming an OEM, via industry knowledge, to a new model of industrial tourism (Yang and Chiu, 2014) 	<ul style="list-style-type: none"> Depending on whether initiatives are led by strategic or ad-hoc decisions, firms have to explore new knowledge and/or exploit existing knowledge to realise competitive advantage (Schrettle et al., 2014) how manufacturing companies can economically introduce environmentally friendly practices to their production operations, whilst at the same time encouraging organisational and operational learning with the aim of eventual evolution of the firm into an eco-efficient concern (Davies, 2012) It mentions the importance of knowledge and value creation for technological

COMMON POINTS	SERVITIZATION	SUSTAINABILITY
		commercialization and innovation for the improvement in projects and processes (Chinta and Kloppenborg, 2010)
MANAGER INVOLVEMENT	<ul style="list-style-type: none"> The study unveils buyer-supplier relationships in a servitized context and provides managers with a better understanding of some of the potential implications that the adoption of a servitization strategy may have for managing buyer-supplier relationships (Bastl et al., 2012) 	<ul style="list-style-type: none"> The Cleaner Production model stands out for promoting the approach of nurturing the concurrent strengthening of quality, productivity, and sustainability in the existing manufacturing processes by dealing more comprehensively with factors internal to the firm that may be directly controlled by the managers (Manzan and Ikuo Miyake, 2013)
CUSTOMER INVOLVEMENT	<ul style="list-style-type: none"> How resources (both material and human) are optimally designed to co-create customer value (Smith et al., 2014) Servitization centres on the transfer of risks from the customer to manufacturer (Gubric, 2014) Servitization aims at supplying a bundle of products and services that offers complete solutions for customers (Demeter and Szász, 2013) One of the main features of strategies related to servitization is customer centricity (Baines et al., 2009b) 	<ul style="list-style-type: none"> For manufacturers to fully realise the performance potentials of GSCM (green supply chain management), they need to integrate internal GSCM practices emphasising functional coordination with external GSCM practices such as cooperation with suppliers and customers in the implementation (Zhu et al., 2012)

Source: own elaboration.

Manufacturers need to jointly consider these five aspects in order to be successful.

3 Research methodology

In order to answer the research question, the secondary data analysis has been chosen as the research methodology.

3.1 Research model

Hakim (1982) defined the secondary data analysis as “any further analysis of an existing dataset which presents interpretations, conclusions or knowledge additional to, or different from, those produced in the first report on the inquiry as a whole and its main results”. It is the analysis of data or information that was either gathered by someone else (e.g., researchers, institutions, other NGOs, etc.) or for some other purpose than the one currently being considered, or often a combination of the two, thus it “can include any data that are examined to answer a research question other than the question(s) for which the data were initially collected” (Vartanian, 2010).

Secondary data can arise from both cross-sectional and longitudinal research designs. While SD coming from cross-sectional designs can be helpful for understanding the prevalence of different outcomes at a slice in time (e.g., physical health or the unemployment rate), there are particular benefits of using longitudinal SD. Longitudinal panel data allow comparisons that are otherwise impossible in cross-sectional and trend designs. Longitudinal SD can also be used to explore population-specific characteristics (e.g., urban or rural environments) from currently available datasets that include decades of economic and census data (Feenberg; Miron, 1997). Moreover, longitudinal data inform theory development by providing opportunities to posit causal explanations of events and explore the mechanisms by which processes unfold.

Having regard to Smith *et al.* (2011), Andersen *et al.* (2011), Doolan and Froelicher (2009) and McCaston (2005) works, it is possible to identify 5 key stages that researchers need to follow during a secondary data analysis:

1. Statement of purpose: it refers to the definition of both research topic and question;
2. Identify a research design: a step-by-step plan to guide data collection and analysis;
3. Data collection:
 - Select dataset(s): finding the type of data needed to answer one’s research questions and planning the construction of a personalized data file. The first step in collecting secondary data is to determine which institutions conduct research on the topic area or country in question;
 - Identify the target population and the appropriate unit of analysis of the target population to best address the research question;

- Get information on the dataset;
- Address missing data: Secondary datasets, particularly in longitudinal studies, often have missing data. Procedures for 'imputing' values for missing data values have been developed that use information from observed data to create data points that are used to fill-in missing values. One of these imputation methods, mean substitution, substitutes the mean of the variable into the missing values for the variable. This method is generally not recommended because it ignores observed information about the subject for whom the mean is substituted and it can lead to biases in the standard errors. More rigorous multiple imputation procedures have been developed that use the original data to create several different datasets, each with the missing values imputed. The general idea behind these procedures is that observed data from a specified set of predictor variables are used to 'predict' or 'impute' values for the missing values;
- Record variables;
- Create new variables: Given the breadth of variables generally available in SD, it is advisable to extract a wider range of variables than might originally be thought useful to allow for unique comparisons and possible scale development or the creation of proxies (variables that similarly explain the constructs of interest);

4. Data analysis:

- Structure the analysis: Based on research question, identify appropriate statistical analysis; Select software package that will implement analysis and account for complex sampling; Examine unweight descriptive statistics to identify coding errors and determine adequacy of sample size; Identify weights; Identify variance estimation method (and corresponding variables) and Conduct diagnostic analyses (identify outliers, non-normality, etc.);

5. Findings presentation: conduct primary analysis and interpret results.

It is possible and important highlight the major advantages and disadvantages of this research methodology.

The secondary data analysis advantages are:

- The possibility to save time and resources by making good use of available data rather than collecting primary data, thus avoiding duplication of effort;
- Depending on the level of data disaggregation, secondary data analysis lends itself to trend analysis as it offers a relatively easy way to monitor change over time;
- Persons with limited research training or technical expertise can be trained to conduct a secondary data review;
- Studies funded by the government generally involve larger samples that are more representative of the target population determining a greater external validity;
- Oversampling of low prevalence groups/behaviours allows for increased statistical precision;
- Datasets often contain considerable breadth (thousands of variables);
- The public availability (via electronic records) of most large data repositories enables researchers at any location and level of expertise to access these resources.

While the disadvantages of the secondary data analysis are:

- Compared to primary data, secondary data are imperfect reflections of reality. Without proper interpretation and analysis they do not help understand why something is happening;
- The person reviewing the secondary data can easily become overwhelmed by the volume of secondary data available, if selectivity is not exercised;
- Sources may conflict with each other;
- Because secondary data is usually not collected for the same purpose as the original researcher had, the goals and purposes of the original researcher can potentially bias the study;
- Because the data were collected by other researchers, and they decide what to collect and what to omit, all of the information desired may not be available;
- Data may potentially lack depth (the greater the breadth the harder it is to measure any one construct in depth);
- The inability to select specific questions or measurement instruments, as well as the lack of control over the precise timing of the data collection.

3.1.1 Research question

The arguments in the previous sections allow formulating the following research question:

RQ: What is the situation of the Italian manufacturing firms - both individually considered and compared to EU manufacturing firms average – with respect the Servitization and the Sustainability concepts?

3.1.2 Data sources and datasets

Data were collected by selecting four different data sources. Most of them are official statistics collected by governments and their various agencies, bureaus, and departments. These statistics can be useful to researchers because they are an easily obtainable and comprehensive source of information that usually covers long periods of time. However, because official statistics are often “characterized by unreliability, data gaps, over-aggregation, inaccuracies, mutual inconsistencies, and lack of timely reporting” (Gill, 1993), it is important to critically analyse official statistics for accuracy and validity.

In addition to the official statistics, also technical reports have been considered. Technical reports are accounts of work done on research projects. They are written to provide research results to colleagues, research institutions, governments, and other interested researchers.

When choosing data sources, it is important to consider the level of data aggregation or disaggregation, which refers the extent to which the information or data is broken down. In particular: aggregate data are data that describe a group of observations, with the grouping made on a defined criterion; while, disaggregated data are data on individuals or single entities. These data are generally more informative and useful than aggregate data, because the more aggregated the data, the more invisible the people.

According to the research purpose of this paper the following data sources, datasets and publications have been selected:

Table 2. Data sources and datasets.

DATA SOURCES	DESCRIPTION	N°	DATASETS AND PUBLICATIONS
EUROSTAT	The Statistical Office of the European Union	1	Industry, trade and services
		2	Environment and energy
		3	Europe 2020 indicators
		4	Sustainable development indicators
		5	Europe in figures - Eurostat yearbook 2014
		6	Key figures on Europe - 2013 digest of the online Eurostat yearbook
		7	Monitoring sustainable development
		8	Smarter, greener, more inclusive - indicators to support the Europe 2020 strategy
		9	Sustainable development in the European Union - Key messages - 2013 edition
		10	Sustainable development in the European Union - 2013 monitoring report of the EU sustainable development strategy
		11	Energy, transport and environment indicators - 2013 edition
OECD	Organisation for Economic Co-operation and Development	12	Country statistical profile: Italy 2013
		13	OECD Factbook 2014
ISTAT	Italian National Institute of Statistics	14	Censimento dell'industria e dei servizi 2011
		15	Benessere equo e sostenibile
		16	L'evoluzione dell'economia italiana aspetti macroeconomici
		17	Il sistema delle imprese. Effetti della crisi e potenzialità di crescita
RESEARCH PROJECTS and ARTICLES	Different research projects carried out by different Institutions and journal articles	18	The Relevance Of Service In European Manufacturing Industries
		19	IMSS – International Manufacturing Strategy Survey
		20	Le Strategie di Manufacturing in Italia

Source: own elaboration.

4 The Italian manufacturing firms: work in progress

4.1 Macroeconomic framework

In order to analyse the situation of the Italian manufacturing firms both from a servitization and a sustainability perspective, first of all, it is important to describe the macroeconomic framework in which the Italian manufacturing firms operate.

In this context, the first data that it is necessary to consider is the GDP.

Table 3. Gross Domestic Product.

	2007	2008	2009	2010	2011	2012	2013
World	5,3	2,7	-0,4	5,2	3,9	3,2	3,0
Advanced Economies	2,7	0,1	-3,4	3,0	1,7	1,4	1,3
Emerging Economies	8,7	5,9	3,1	7,5	6,3	5,0	4,7
Central and Eastern Europe	5,3	3,3	-3,4	4,7	5,4	1,4	2,8
Italy	1,7	-1,2	-5,5	1,7	0,5	-2,4	-1,9

Source: International Monetary Fund – World Economic Outlook, 2014.

How it is shown in the table 3 in Italy the economic growth remained weak and inferior to both the pre-crisis pace and respect to the average of the other economies considered.

4.2 Work in progress

This paper aims to analyse the situation of the Italian manufacturing firms through the analysis of secondary data.

In order to do so, four different data sources have been selected and twenty datasets have been found.

The next step will be the identification of new variables to analyse the secondary data available through a statistical programme (e.g., SPSS, STATA, etc.).

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Challenges of customer oriented health care service models – Perspectives from the renewal of a primary health care and integrated care system

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A transition towards a customer-orientated health care service system requires a broader socio-technical and paradigmatic change. The current service system includes established practices which make the paradigmatic changes appear difficult to health care professionals and customers. By using multi-level perspective, social innovation and a chronic care model, we have examined these factors and analysed the challenges from the perspective of two case studies: an integrated care system and the primary health care. As a result, new services, a shared vision, linked development activities, changes in the mindsets and empowering customers to manage their health and participate in developing activities are necessary.

Keywords: Health care, innovations, service innovation, social innovation, systemic change, multi-level perspective

1 Introduction

Chronic diseases are increasing and the ageing of population accelerates this phenomenon. The ageing population means that a larger proportion of people has chronic diseases and at the same time medical scientific knowledge is growing quickly leading to more diagnostic procedures and treatments. At the moment, chronic diseases account for most of health care expenditure. In Europe an estimated 86% of the deaths and 77% of illnesses are caused by chronic diseases (WHO 2014). As a result, major challenges emerge in the health care service system, threatening individual welfare as well as society's development and growth. Because of chronic diseases, health care has changed from individual consultation to multi-professional teamwork with many health care providers (Ouwens et al. 2005). It is also critical to emphasise the role of self care, when dealing with chronic diseases. The WHO's definition of health minimises the role of people's capacity to cope with chronic diseases, as it defines health as a state of complete physical, mental and social well-being, and not merely the absence of diseases or infirmity. There have been suggestions (Huber et al. 2011, Godlee 2011) of changing the definition of health towards the ability to adapt and self-manage when it comes to social, physical and emotional challenges.

Customer-oriented thinking and ways to coordinate services have been suggested as a solution. The aims of integrated care programmes are usually to reduce fragmentation and improve continuity and coordination of care by placing customers in a central position. (Ouwens et al. 2005) However, the discussion on customer-oriented health is not new and the problem has been in identifying effective ways to develop new relationships between health professionals and customers within integrative services delivery systems. Service innovations are needed in order to improve or create new health products and ways of interacting. The individuals and institutions need to move in the same direction and customers need to be empowered to have the knowledge and skills to deal with their illnesses and also with new changes in the health system.

These requirements also reflect a paradigmatic shift in the public sector. This is an important factor, since in most countries the state and local authorities are more or less the organizers and funders of healthcare. The role of the professions has traditionally been very strong in healthcare: interaction has been based on knowledge asymmetry highlighting the position of doctors (and to some extent nurses) over customers (Alvesson, 2004; Löwendahl et al., 2001). The paradigm that understood the public sector in terms of top-down policy activities, was dominant until the so-called 'New Public Management (NPM)', which introduced market mechanisms into the public context: business-type management, lean processes, performance focus, and contracting-out (Hartley, 2005; Hess and Adams, 2007; Windrum and García-Goñi, 2008). One of the most important ideas has been treating the patients as customers who have the right to require a high quality of service (Langergaard, 2011). The limits of NPM, however, have become apparent along with the development towards increasingly complex issues, multiple actors and need for open dialogue (Sørensen, 2002). NPM is still the dominant public paradigm, but there is a new paradigm emerging: so-called 'network governance', which highlights relationships and partnerships, and co-production as the service model (Newman and Clarke, 2009). For the professional practice in public services, it means additional challenges because efficient in-house processes are no longer sufficient, and the crucial issue is the empowerment of citizens and stronger customer orientation.

A change towards a customer-oriented service system is not straightforward. Conversely, the challenges require large-scale socio-technical changes based on the simultaneous development of organisations, technologies, services and multiple network relationships (Gallouj, 1994, 2002; Windrum and García Goñi, 2008; Harrison et al., 2010; Rubalcaba et al., 2011). New innovations are needed so as to ensure the quality of health services and the effective use of resources. Furthermore, understanding of the whole socio-technical system, including the dynamic and interplay between parts of the system as well as the social support and social engagement are essential in aiming at the system

level solutions (Geels, 2002, 2004). New visions and models of health care are needed outside the current system. Koivuniemi and Simonen (2011) have also argued that perspectives from different fields could provide a breakthrough, because the perspectives are not locked into present system and therefore new ideas can occur.

This paper examines the development and introduction of customer-oriented service models in the Finnish health care services. It studies how the transition can be carried out from production-oriented to customer-oriented care models. The analysis is carried out from two different perspectives: from an integrated care system point of view and from a municipal primary care organization. The development of customer-oriented service models in Finnish municipalities can be seen as a niche level innovation. At the same time, it requires system level change.

The purpose of our paper is to identify the challenges of implementing an integrated care model and thus to understand the challenges of socio-technical change in Finnish health care service system. The following research questions are guiding our work:

- What kind of challenges occurs when tackling socio-technical change?
- What are the key factors required to tackle the socio-technical change and implement customer-oriented service models in health care?

At first we describe our theoretical framework which is based on social innovation, multi-level perspective and chronic care model. Then we present our case studies and continue to the research results. In the conclusion, we discuss the challenges faced in the two cases when developing customer-oriented services, and end with the conclusions of our research.

2 Theoretical background

The current social, economic, and environmental challenges are too big to be met via individual product and service innovations created in individual organizations. A crucial question is how to combine various innovations effectively and how to disseminate them on the basis of continuous interaction between multiple actor-groups. In other words, examining and developing innovations at the systemic level has come to the fore. In order to analyse the complex system level transformation, it is necessary to understand the whole socio-technical system and the process of the social support and social engagement (Gallouj, 1994, 2002; Geels 2002, 2004; Windrum and García Goñi, 2008; Harrison et al., 2010; Rubalcaba et al., 2011.)

Three theoretical frameworks form our starting point in understanding the broad system level transformation in the health care sector and in analysing both complex interaction in development and implementation and new innovative customer oriented services. The first framework is a multi-level perspective to change. It helps in describing the wide development environment of new solutions and the dynamics in developing and disseminating them. The second perspective, social innovation, forms the meso level: here we focus on the bottom-up and top-down activities that function as an engine for the change. Finally, we examine customer-oriented service models in health care; the chronic care model (CCM) and integrated care models based on it as a manifestation of renewal and change activities in health care.

2.1 A multi-level perspective to understand complex systems

We have applied the multi-level perspective (MLP, see e.g. Geels 2002; Elzen et al. 2008) as the overarching theoretical framework explaining the dynamics of transformation in social and health care system. The multi-level perspective facilitates the analysis of the emergence of a new system as an outcome of interaction of different actors and structures and thus provides understanding of the dynamics of systemic change and system innovation. One of the key features of the MLP is its focus on long-term thinking. Another is its explicit focus on the interconnectedness of technological and social systems, including governance models and institutions.

According to the MLP, a crucial element in a systemic change is the interplay between processes in different system parts in different phases of the development and dissemination of new innovative solutions. It stresses that technological systems change through interplay between landscape, regime and niche level processes. Socio-technical landscape refers to relatively stable, slowly changing factors such as cultural and normative values, long-term economic developments and societal trends. The socio-technical regime refers to established practices in the existing socio-technical system, including the institutions, infrastructure, regulation as well as organisational and social networks to structure and organise a particular societal function such as health care. The set of rules (e.g. agreements, directives, moral codes) are carried by different actors (such as users, policymakers, scientists, and public authorities) and practices and action models based on these rules, and interaction between actors. Niches refer to initiatives and activities in special application areas or bounded geographical areas.

Regimes tend to generate incremental innovations, while radically new innovations are generated in niches which are protected from 'normal' market selection. Radically new innovations need protection because their cost efficiencies, technical performance and usability often need improving. Niches provide locations for experiments and learning processes, and space to build the social networks, which support innovation. (Geels 2004, Geels & Kemp, 2007; Kivisaari et al., 2013.) In practice, well planned and long-term management is rare. Governments are deeply embedded within socio-technical system, and therefore they face difficulties in bringing about radical changes. For this reason,

policies tend to aim towards incremental or conservative innovations. (Lovell 2007) Geels (2004, 37) explain that radical innovations break from the niche-level when the external circumstances are right, that is, when on-going processes at the levels of regime, landscape and timing create a window of opportunity. Particular attention is paid to the involvement of 'forerunners', i.e. representatives of innovative solutions that challenge the current unsustainable socio-technical systems.

A multi-level perspective sees that transition only occurs through development at all three levels. Practitioners who participate in transition experiments operate in a multi-level environment. The multi-level environment requires them to act strategically by connecting problems and solutions at different levels. From the practitioners' point of view, the possibilities for guiding transition are limited, because it depends on actors, developments and events at other levels as well. The distinction between the three levels is useful for understanding socio-technical change and can be seen as a tool (rather than viewing them as real entities). (Raven et al. 2010).

2.2 Social innovation as an engine for a renewal

System level innovations are interlinked with social innovations. In the literature on social innovation, the concept 'social' includes two different aspects that are both essential when innovations are pursued at the system level. The first aspect refers to the complex economic and social problems form the starting point of innovation endeavours (Harrison et al., 2010). Social innovations are sought for a wide range of issues in different realms of society: community infrastructures, housing, workplace design, education etc. (Moulaert et al. 2005). The solutions include the simultaneous development of technologies, services, organisations and networks. Regarding the goals, social and systems innovations have much in common. Both tackle prominent societal challenges, among which ageing of the population is primary.

In this paper, we concentrate on the second aspect of 'social': the participatory processes which are necessary for the emergence of innovations in a multi-actor environment. Also in the novelties created, new ways of interacting is an important ingredient. Social innovations may emerge at the grassroots level among users and employees; be produced by private, public and third sector organizations; or be initiated by policy and regulatory bodies. In all cases, it is essential to integrate bottom-up and top-down processes (Rubalcaba et al., 2012).

Bottom-up grassroots activities constitute an 'engine of social innovations' and are linked to user-driven and employee-driven approaches in innovation (cf. Sundbo and Toivonen, 2011). The creation and implementation of social innovations highlights empowerment: citizens are not passive recipients, but active co-developers (Harrison et al., 2010). When social innovation is studied in terms of empowerment and participation it shares similar qualities with Strategic Niche Management (SNM). SNM is a perspective developed as a part of the transition management approach (Schot & Geels 2008), and it focuses mainly on studying the development and diffusion of innovations as a dynamic learning process between multiple actors.

On the other hand, top-down activities are also necessary for the materialisation and dissemination of social innovations. They are needed both at the organisational and community levels and at the level of policies and regulations. Community decision makers and company managers have to support, recognise and organise bottom-up processes in order to make ideas implementable and scalable (Høyrup, 2010). Policy actors have to enhance society's innovation capacity by revitalising innovation institutions and by fostering the innovation activities of public, private and third sector organisations (Rubalcaba et al., 2012).

2.3 Integrated care programmes as an answer to challenges in health care sector

Within the health care sector, the current pressure for changes is reflected in the renewal for chronic care. The integrated care programmes have highlighted the need for customer support and education, combined with structured clinical follow-up and case management; a multidisciplinary patient care team; multidisciplinary clinical pathways and feedback, reminders, and education for professionals (Ouwens et al., 2005). These programmes are carried out in various countries and are based on the chronic care model (CCM) developed to improve the management of chronic illnesses through six cornerstones: utilizing community resources, developing health organizations, investing in self-management support, redesigning service delivery, employing decision support for professionals and utilizing clinical information systems. Segmenting the chronic customers according to the intensity of care needs is a part of the model. A three-group division, the so-called Kaiser Permanente Triangle - is typical and consists of customers with multiple diseases, customers with high risks, and customers with a self-manageable disease (Bodenheimer et al., 2002). The elements of CCM in integrated care programmes are summarized in Table 1.

Table 1. Central elements of CCM (Bodenheimer et al., 2002 and Ouwens et al., 2005).

Central elements of CCM	Contents of the element in CCM and in the integrated care programmes
Renewal of health care organization	Ensuring that the health organization is committed to take care of patients with lifestyle and chronic illnesses and structured its activities accordingly.
Identification of customer subgroups	Making a division between customers with multiple illnesses, patients with high risks and patients with self-manageable long-term illnesses.
Self-management support and patient education	Helping patients to acquire skills to manage their own illnesses.
Follow-ups	Monitoring the customer on a regular base, e.g. by utilizing phone calls.
Case management	Allocating care to a small team who takes responsibility for the guidance of the customer in the care processes.
Multi-disciplinary care team	A care team composed of different professions who collaborate in the care of defined customer or customer group.
Multi-disciplinary clinical pathway	Structured multi-disciplinary care plans for professionals with detailed steps in the care of customers.
Professional education	Education provided to professionals about the appropriate care for patients.
Supportive information systems	Registry's for patient information and treatment plans.
Community resources	Creating linkages with community-based resources to support care.

CCM, together with the integrated care programmes based on it, differs greatly from the models of acute care and the expert -led health systems that have earlier been dominant in the health care sector; they are customer-centred (not sickness-centred), their focus is on planned, proactive care (not only on the acute, reactive care) and they provide support to the customer (not only diagnostic information). Treating customers as experts in their own health and empowering them to become partners in care is eventually expected to ease economic constraints in the health care sector (Coulter, 1999). An important insight in the circumstances of an ageing population is that the quality of life can be high even when a person has a chronic disease. Health does not only mean the absence of disease, but it includes the capability to cope and function with everyday physical, emotional and social challenges (Huber et al., 2011). The above-described views have sparked the need to examine how the health systems could be rebalanced from addressing the treatment of acute illness to promoting health, and how the citizens themselves could be engaged in the latter task.

3 Case context and methodology

In the empirical part of our paper we focus on two separate cases in order to study the application of customer-oriented service models in Finland. It has been recognised that health care organisations in Finland struggle with the increased customer pressure and reduced resources of health care professionals, and can no longer ensure health impact in the present system. Challenges faced in health are similar to the ones in other Western countries due to the ageing of the population, rising expenditure and growing inequality in the access to services (OECD, 2005). In addition, it has been claimed that in Finland the problems also relate to the small size of the service providers, current service structure and inefficient management system (Kivisaari et al., 2013)

At the moment, there is an on-going preparation for social and health care reform which will be running from 1 January 2017. The key objective in this reform is to promote health and wellbeing and also to ensure equal access to social and health care services in all parts of the country. One objective is also to promote integration between social and health care services and create a seamless package from primary and specialised services. (Social welfare and health care reform)

Our paper is based on two case studies that focus on different levels of operations and management, but the core questions are the same: how to create and promote the use of customer-oriented service models in a complex socio-technical environment. In the health care sector, the adoption of CCM represents a paradigmatic shift towards customer-oriented service systems, and in our analysis we will examine the central elements of the model from two perspectives: from an integrated care system's point of view and from a municipal primary care organizations. The development of customer-oriented service models in Finnish municipalities can be seen as a niche level innovation. So far, consensus for a customer-oriented health care system has not been accomplished in Finland (Virtanen et.al 2011) Our paper identifies the challenges faced by the two case studies and highlights the barriers to why consensus in Finland hasn't been accomplished yet.

3.1 Developing the customer oriented service model for citizens with cardiovascular diseases

The first case study focuses on developing new customer oriented service models for citizens with cardiovascular diseases. The aim is changing the care of people with cardiovascular diseases by implementing a new customer-oriented integrated service model at a local level. The integrated service model is used in regional and university hospitals as well as in primary care. The goal is to create a generic solution, but at first the emphasis is on cardiovascular diseases and implementing a new integrated service model in use at a local level. A service model is developed in collaboration with multiple regional and national partners including a university hospital, a regional hospital, local health centres, 3-sector organisation, research partners and municipalities.

The new customer-oriented service model aims at supporting the operation of health care and medical treatment, controlling the network of service providers as well as encouraging customers to self care. The development of a new service model is focusses on three specific issues. The first is that the customers should be seen as the expert in their own health and treatment. The second is that the customers should be an equal partner with the health care professionals, and the third is that the care process should be customer-centred. An additional aim in the process is to develop tools that enable customers to participate more actively in their own care. One tool created tool is an online navigator, which integrates to personal health record. Online navigator supports self care and, moreover, gives the health care professionals information about the quality and effectiveness of treatment and gives them the opportunity to manage operations. Development has thus focused on both technological and social service innovations.

An idea behind this development is to empower people to take care of their health and treatment for their illness by giving individual and well-timed support and thus improving health outcomes in a sustainable and cost-effective way. However, the change towards these goals is not easy, because the ideology behind the development is fundamentally different from the mindset of the current service system. The new service model brings changes to professional and customer relationships as it empowers customers to become an active part of their treatment. This also requires new models of operation from the customers. Although the need for new service models is identified by professionals and customers, the change is so paradigmatic, it appears to be ambiguous and difficult to grasp. At the same time the customers need to be empowered by the help of a supporting network and national definitions of policies are needed in order to support the change. A shared vision is essential.

Methodology

Our data collection was conducted between 2011 and 2013 via interviews and workshops. At first, we interviewed ten national and regional welfare and health care experts (see Leväsluoto and Kivisaari, 2012). The interviews were carried out between the autumn of 2011 and the beginning of 2012, and the aim was to map the experts' outlook on customer-oriented service models and their adoption into practice.

After the interviews, empirical work continued in workshops with a large network of stakeholders by using participatory foresight, embedding and stakeholder analysis (see Kivisaari, Kohl, Leväsluoto, 2014). One central aim in the workshops was to create a platform where different perspectives were viewed and discussed in order to promote trust, understanding and a shared vision. As the interviews unfolded that shared understanding is essential to change, the study was based on empirical experiment, which aimed at promoting the creation of a shared understanding of what the change entails and how it can be carried out. We focused on studying how transition from a production-oriented to a customer-oriented chronic care model can be carried out.

The empirical experiment was divided into three workshops. In the first workshop, we developed a shared vision with our partners of what customer-oriented services would look like in the year 2030. Based on this workshop, we started developing vision paths for the change. In the second workshop, with large participation of stakeholder from different organisations and levels, we aimed at creating a shared understanding of necessary stakeholders who are essential for the change. The second workshop gave more information for the development of the vision paths. Based on the interviews and the two workshops, we identified three vision paths which represent different levels. The aim of the third workshop was to deepen the understanding on what local stakeholders can do to foster the change.

3.2 Renewal of a local primary health care system

The second study focuses on the renewal of a primary health care system in a middle-sized city of approximately 67 000 inhabitants. The renewal has been going on since 2010 and is linked to a broader national exercise for social welfare and health care. The efforts have been a part of a national development plan for social welfare and health care (KASTE) supporting the development and implementation of the CCM principals altogether in 61 municipalities. The renewal is led by the city's health organization, which is responsible for organizing the primary care services in 8 health centres.

The health organization has been exceptionally active in learning about the newest developments of the CCM model and integrated care programmes and in testing them in practice. The aim is a systemic change in the health service generation, which is why the renewal activities focus on a comprehensive change in the entire operational model. Primary care in the city is under great development pressure due to reduced resources of health care professionals and the constantly growing customer queues that burden the current health care system and hinder the citizen's access to

services. It was recognized that the old system of primary care functioned for the care of acute illnesses and did not support the increasing number of customers with chronic and lifestyle illnesses. Without development actions the system would eventually collapse.

Moving away from the traditional professional expert – led health system and creating a system that supports the self-efficacy of customers has been identified as the key to the transformation. The current system of primary care has been dominated by the traditional ‘expert professional – passive patient’ –approach, and the role of the customers in the care of chronic and lifestyle illnesses has not been actively supported. The care is reactively rather than proactively organized, the self-management of illness is not supported and the care lacks systematics and planning. This is the challenge of the ‘unfinished patient’, which results in the slowness of care processes and expenses caused by long customer queues (Kivisaari et al., 2009). The problem stems from the lack of process management. To create an empowerment –based system of primary care, the health organization is comprehensively renewing its entire operational model; the delivery of services, management the model and ICT systems. Three goals for the transformation have been set: 1) improving the availability of services to citizens, 2) providing better health impact, and 3) improving productivity by reducing the resources used per customer.

Methodology

Our extensive data, which has already been gathered on the case during 2013 and 2014, consists of primary data based on non-participant observations, action research, interviews, research diaries and documentation. It is supported by secondary data including documentation of the renewal process, reports, and the learning diaries of some personnel representatives. To gain an extensive understanding of the transformation, observation, action-research and interviews have been utilized. The weekly meetings of two management teams responsible for renewal activities of the case organization were observed during February and June 2013. During the first three months, our research group observed without any participation to gain an overall conception of the on-going transformation process. For the final two months, we then adopted an action research strategy: participating in the teams’ conversations and pointing out problems related to the systemic change and solutions development. A detailed memo was created after every meeting. The material gathered from the observations and participations has been further supported by individual face-to-face interviews (15 in total) with all the team members. These interviews were conducted in June and July 2013. The observations and action research carry on until December 2013, and during year 2014 the gathering of the case material has continued in monthly workshops with the management team, which will continue until the end of year 2014. This is seen as necessary in order to gain insight on how the innovative solutions and behaviour has developed throughout the process.

4 Research results

Both cases analysed aimed at developing a new customer-oriented service system where customers are seen as experts, and encouraging them to self-management. The need for systemic change towards customer-oriented services comes from the individual need to manage chronic diseases. In addition, the economic pressure and the need to ensure service quality and health impact motivate the renewal. To create a customer-oriented integrated care system is one step towards a system level customer-oriented service system. National coordination and support is needed so as to promote the change, but the bottom-up innovations are equally important.

The need for paradigmatic change is also acknowledged by health care professionals. However, there are different views on what kind of changes are required towards customer-oriented service models, what the time scale should be, and who the actors are that are needed to promote the change. From the point of view of socio-technical change, it is essential to build a shared understanding of what customer orientation means in the social and health care system. A systemic approach can help people to realise that the comprehensive change requires changes in different practices, processes and levels which happens in parallel processes.

To analyse the elements and challenges of adopting customer-oriented service models, we utilized the approaches of the multi-level perspective, social innovation, CCM and integrated programmes. In table 2 we have summarized our results based on elements adopted from these approaches.

Table 2. Elements and challenges in applying customer oriented service models.

Elements	Renewal of a hospital district; integrated care model for people with a cardiovascular disease	Renewal of a local health care organization; primary health care	Synthesis of the two cases
Organisational renewal	<ul style="list-style-type: none"> • Renewal of operation model through an integrated care model which has been created in a customer-oriented way • Identified problems are a lack of indicators to analyse impacts from new service models; management and care divided into silos, identifying the necessary change, how to proceed, who are needed for change 	<ul style="list-style-type: none"> • Renewal of the entire operational model: setting the management of chronic illnesses as the main goal; simultaneous renewal of the organisational structure, management model, financial structure, health services, working methods and tools; creating <i>new service-oriented positions</i>: service managers, service superiors and service coordinators • Understanding the extent of the development and the systemic nature in transforming the organisation is challenging, as these kinds of developmental activities are new to the personnel and include various stakeholders 	<ul style="list-style-type: none"> • The aim is to develop customer-oriented service system which means changes in current operation models • Professionals agree on the need of new service models for chronic care • New indicators are needed to analyse impacts • The scale of the changes needed is confusing to stakeholders and silos between health care organisation complicates development
Customer subgroups identification	<ul style="list-style-type: none"> • Identify different needs of customers and implement customised health treatment plans • new online navigator to identify customer needs • Implementation of the new online tool to be used in hospitals and health centres requires training and time 	<ul style="list-style-type: none"> • Distinguishing customers with chronic illnesses and multiple diseases from customers requiring acute care. Creating care “channels” for these two sub-groups according to the health situation • Segmenting customers is challenging; the health care professionals have a critical role in identifying customers. Constant hurry and old habits influence the guidance of customer flows. 	<ul style="list-style-type: none"> • Identification of different customerships and needs • Developing new services based on different needs • Implementing these new service takes time and recourses
Self-management support	<ul style="list-style-type: none"> • By identifying different customerships professionals can provide specific information to customers about their chronic disease and self-management and support customers to manage their disease and treatment with individual treatment plans • self-care groups and points available 	<ul style="list-style-type: none"> • Investing in services supporting self-management: group services arranged for educating customers about their illnesses and about the prevention of further problems. • Attending group services is new to customers, who are used to getting guidance in person from a health professional; traditional views on how health is promoted dominate 	<ul style="list-style-type: none"> • New services for customers to support self care • Customers are not used to using group services • Offer different self care options to different customer needs
Follow-ups	<ul style="list-style-type: none"> • Online navigator where the customers and health care professionals can keep in touch. Also, text messages and reminders are being used • Using the online tool is not familiar with customers or health care professionals. How to motivate people to use this tool on a regular basis? 	<ul style="list-style-type: none"> • Empowering customers with target-oriented phone calls by nurses to see how the care is proceeding. Focusing on a coaching approach to support customers in achieving goals. • Coaching requires new skills of facilitation, negotiation, synthesizing information and utilization of customers’ own initiatives from the health care professionals 	<ul style="list-style-type: none"> • Aims at supporting self care by using new methods of follow-ups • New services and methods are not familiar to professionals or to customers
Supportive information system	<ul style="list-style-type: none"> • Online navigator programme is a central part of the integrated care model where the customers can see their health and treatment plans, health record, discuss with peer groups and professionals and allocate support • Unconnected data systems are a challenge 	<ul style="list-style-type: none"> • Utilizing eHealth-system for the communication between customers and professionals: allowing customers to see their test results, treatments and health plans, and to transfer the measurements that they make themselves (e.g. blood pressure). • The system is still seen as a one-way communication tool and not a tool for interaction. There are also some challenges to how the system functions 	<ul style="list-style-type: none"> • New IT services for customers and professionals • Customers can see and create themselves information about their health and thus become more aware of their health status

Elements	Renewal of a hospital district; integrated care model for people with a cardiovascular disease	Renewal of a local health care organization; primary health care	Synthesis of the two cases
Customer management	<ul style="list-style-type: none"> Customers have their own doctor, own nurse, coordinator, case or care manager depending on their need Lack of resources Information doesn't move between different organisations 	<ul style="list-style-type: none"> Assigning of a responsible professional/professional group with whom the customer interacts directly regarding the issues concerning the treatment. 	<ul style="list-style-type: none"> Identifying the professional who is responsible of the care In the first case, the signed professional depends on the identified customership while in the second case the concept is about comprehensive coordination of customers
Multi-disciplinary care team	<ul style="list-style-type: none"> Integrated care model is planned so that the multidisciplinary work is at the centre especially in those cases where the need for professional support is the greatest Established boundaries and attitudes between health care professional is causing problems Silos between organisation in health care 	<ul style="list-style-type: none"> Diminishing professional hierarchy; establishing multi-disciplinary teams to collaborate with the customer; supporting holistic care - not focusing on one disease at a time. Old habits dominate; collaboration still occurs in the form of transferring case to another professional and again to another, rather than basing the care on mutual discussion and interaction around the customers' health issues 	<ul style="list-style-type: none"> Multi-disciplinary care is as an overall aim Established boundaries and attitudes between health care professional and silos between organisation prevent multi-disciplinary work
Multi-disciplinary clinical pathway	<ul style="list-style-type: none"> Health plan for all customers with cardiovascular disease Establishing an integrated care model for customers with cardio vascular Implementation of the integrated care model is sometimes challenging 	<ul style="list-style-type: none"> Creating a systematic health plan in mutual collaboration between the professional and the customer according to goals set by the customer Supporting and coaching customers to set long-term goals is new to both professionals and customers. Traditional transactional views on health care hinder the goal-oriented and holistic care 	<ul style="list-style-type: none"> Health plans are created in collaboration between customers and professionals Establishing new integrated care models Setting goals is new when treating chronic diseases
Professional education	<ul style="list-style-type: none"> Professionals have been participating actively in developing and implementing the new integrated care model. Various workshops have been arranged for discussion and development Customers have all the time more information about health issues A barriers is how to motivate the professionals to participate to the workshops Locked-in's in the current system perspective 	<ul style="list-style-type: none"> Arrangement of workshops for the professionals about the re-organizing of care and new operation models around specific topics. Encouraging learning dialogue between professionals Challenges in getting the personnel to become motivated and participate in the workshops. Open dialogue and co-development still lacking 	<ul style="list-style-type: none"> Both customers and professionals need to change their perspective on how to be a customer or an expert. Customers need to become more of an expert on their own care and health care professionals more of a sparring partner Education for professionals on the new services and models Question about how to motivate professionals to participate in workshops and education events
3 sector	<ul style="list-style-type: none"> 3 sector are an essential part and the customers are given information about peer groups and rehabilitation and health training courses On some occasions, it is difficult to get customers to participate these courses 	<ul style="list-style-type: none"> Collaborating with patient organizations, which can provide information, advocacy, peer support, training, rehabilitation and social events for customers Different interests among groups, active collaboration relationship with the third sector is not yet established 	<ul style="list-style-type: none"> Customers are given opportunities and information about 3 sector courses group meetings
Customer voice and empowerment	<ul style="list-style-type: none"> Perceive customers as experts on their own health, using the knowledge that customers have of their own health Requires changes in customer and professional relationships Change do not happen without a crisis and customers are often forgotten Different attitudes and languages 	<ul style="list-style-type: none"> Treating customers as partners in health promotion; empowering them to take their health into their own hands; changing the power distribution in the care process The shift in the professional identity of health care professionals from being a nurturing expert to becoming a coaching partner does not come easy and should be supported 	<ul style="list-style-type: none"> Point of view that only a crises can change the attitudes and the course of action To encourage customers to self care and using their expertise on their own health by offering new services The shift in customer-professional relationship is needed

Elements	Renewal of a hospital district; integrated care model for people with a cardiovascular disease	Renewal of a local health care organization; primary health care	Synthesis of the two cases
Governance, legislation and policy instruments	<ul style="list-style-type: none"> • Shared vision of the future is missing • Investments over sectorial borders • New improvements in Finnish health care legislation • Point of views of politicians' are narrow and divided into silos • Development projects are divided into small projects; continuity is a problem • Hybrid actors are needed to promote change in multiple levels 	<ul style="list-style-type: none"> • Creation of collaborative networks with municipal decision makers; creating partnerships with other Finnish primary health care units • Networking with stakeholders is challenging, as it is new to the organisation and there are no established ways of collaborating; true operational collaboration within the municipality has been missing; confusion of who has the overall coordination responsibility of the transformation 	<ul style="list-style-type: none"> • Supporting health should be seen as a as an overall goal which needs actions from different sectors • A shared vision is needed to promote change towards customer-oriented service models • Who are the responsible stakeholders to promote change?
Pilots and experiments	<ul style="list-style-type: none"> • New service models are needed • Professionals cannot promote change by themselves, customers need to be involved • Diffusion of service innovation is difficult 	<ul style="list-style-type: none"> • Piloting activities are carried out in implementing new services • The feedback-loop from customers and professionals to the development team is missing. Customers are not an active part of the development 	<ul style="list-style-type: none"> • Project needs to be more coordinated so that they support each other and thus new innovation can spread • Customer need to be involved when developing new services

5 Discussion

Both cases analysed aimed at developing new customer-oriented services. Supporting self-care has been promoted by offering services and new tools where customers can see and create for themselves information about their health. This has been done in our first case study by implementing a new online navigator, whereas our second case study has focused more on personal follow-ups by professionals. In the second study, self-care is supported by implementing new services, such as the eHealth system, group services and target oriented contacts from health professionals. In both case studies, the aim was to identify the professionals responsible for the care. In the first case study, the professional is assigned based on identified customership and the needs of the customer. In the second study the idea is to assign a professional responsible for the whole care of the customer. Identifying different needs of customers was one of the key aspects in our first study and it was not emphasized the second study. However, this is most likely because in our first case study the focus was on one disease and its integrated care model, and in our second case study the emphasis was on renewal of the entire primary health care services and investing in holistic care rather than focusing on one disease group. Multi-disciplinary care and clinical pathways are an aim in both our cases. Education of professionals has been offered, and it is seen as an important tool in affecting the attitudes of health care professionals. 3 sector services are also offered to customers as a tool for support self-care.

From the results we were able to identify the key requirements and factors that are needed in pursuing a system level transition in the health care sector. The focus in the renewals should be on strengthening service-thinking in health organizations and care processes. Making the change from the traditional reactive and expert-centred approach to care towards empowering customers in care processes requires creating new service solutions that better serve the needs of customers. From the point of view of ensuring economically sustainable and high quality health care, it is essential to recognise customers' own recourse to self care and to offer extra support for those customers who need help from the professionals. To monitor the success of developed solutions and the extent of health impact, new indicators are also required. Identifying key stakeholders and establishing collaboration networks where hybrid actors can act as a link between regime and niche levels are essential during the development of customer oriented service- models. A shared vision among actors is needed to promote change towards customer-oriented service models. For example, strengthening collaboration with the third sector so that they become an active part of the health system is required so that the care of customers is supported by the provision of information, services and support enhancing health promotion more holistically. The silos between health care organisations are seen as a barrier to implementing services where the customer is seen as a subject and not an object of treatment. Supporting health should be as an overall goal needing actions on the part of different sectors which also highlights the need for stronger coordination of renewal activities.

The collaborative network approach should also reach the health professionals implementing new health services and work activities, as the profound change in health care provision requires a stronger multi-disciplinary team work in treating customers. Forums that enable interaction should be developed and provided so as to support the new ways of collaboration. In health care, established routines are not easy to break down. The transition is also greatly dependent on the transformation of the professional identity from being a nurturing expert to becoming a coaching partner. The willingness and attitudes of both the customers and the health professionals are crucial factors in adopting new practices, and are greatly influenced by prevailing attitudes and values. Adopting new forms and practises of care depends on factors linked to human behaviour and interaction; one significant challenge is the cultural mindset change in the customer – doctor/nurse relationship, which requires a reformation of power distribution – both customers and

health care professionals need to change their perspective on how to be a customer or an expert. The health professionals have to see the customers as partners in care, and the customers need to take a stronger role in promoting their health (see Ouwens et al. 2005). Professional identity does not change overnight, and investing in support, guidelines and education for health professionals as well as for customers in adopting new ways of collaborating is essential, as adopting new practices also requires new skills of facilitation, negotiation, synthesizing information and utilization of customers' own initiatives. The availability of information and the possibility of preparing for the care is a significant development, as the customers have the possibility to access and utilize their own health information.

Another significant factor arising from both our studies is the need for stronger customer participation in developing and implementing customer-oriented service models. Though the language used is changing towards customer orientation (patients are seen as customers, see also Langergaard, 2011), the reality of utilizing customer views in the renewal activities is lacking. The culture developing in health organisations should change from seeing customers only as targets to seeing them as resources for innovation. The lack of customer participation in the health care sector can partly be explained by the fact that innovations in public sector usually originate from disconnected impulses from employees interacting with customers at the grassroots and from managers implementing policy requirements (Sørensen et al., 2013). These two approaches are difficult to merge. However, we argue that in order to achieve true customer-orientation in service models in health, the voice of customers need to be heard and utilized.

6 Conclusion

This paper has examined the challenges of implementing an integrated care model and thus understanding the challenges of socio-technical change in the Finnish health care service system. A multi-level perspective, social innovation and a chronic care model were used as a theoretical framework in understanding the broad system level transformation in health care sector and in analysing both complex interaction in development and implementation and new innovative customer oriented services. Our paper was based on two case studies. The case studies represented first a renewal of a hospital district in developing an integrated care model for cardiovascular disease, and second a study based on the renewal of a local health care organisation focusing on primary health care.

Making the change from the traditional reactive and expert-centred approach to care towards empowering customers in care processes requires creating new service solutions that better serve the needs of customers. Collaboration networks and coordination in development activities are needed to be strengthened and identifying and supporting hybrid actors is one solution to this. A shared vision among actors is needed to promote change towards customer-oriented service models and breaking the silos inside health care is essential. All in all, supporting health should be seen as a as an overall goal which needs actions from different sectors.

Changing the attitudes of both the customers and the health professionals are crucial factors in adopting new practices as well as changing the cultural mindset in the customer – doctor/nurse relationship. Support, education and guidelines are needed to health care professionals and customers in adopting new ways of collaborating. Another significant factor arising from both our studies is the need for stronger customer participation in developing and implementing customer-oriented service models. In order to achieve true customer-orientation in service models in health, the voice of customers need to be heard and utilized.

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Travel Experience creation in the context of mobile technologies

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The purpose of this paper is to understand how travel experience emerged in distinct context of mobile technologies. Study results show that the combination of characteristics of personal, virtual, networked, and variety functions of mobile technologies enables customers have more initiative to manage and create their travel experience. These findings indicate public transport operators should design different service platforms to let customers create experience by their own initiative. The record emerged through such service platforms can be helpful to have broaden understanding of customer behaviour.

1 Introduction

The customer experience is important for all kinds of services, both scholars and practitioners (Pralhad; Ramaswamy, 2004b; Helkkula et al., 2012) view the creation of such phenomena as an imperative component of the service firm's success. It is vital to not only experience-centric services (Zomerdiijk; Voss, 2009), but even non experience-centric ones, such as public transportation.

Yet despite the recognition of the importance of developing superior customer experience in service sector, the academic literature has not considered customer experience as a separate construct. Traditionally, customer experience studies has usually centered on consumption during the service encounter (Zomerdiijk; Voss, 2009; Berry et al., 2006; Meyer; Schwager, 2007), focusing on understanding how the firm should create and manage superior experiences for its customers. More recent researches, following service-dominant logic (Vargo; Lusch, 2004), contemplating on both customer and company co-create experiences together (Teixeira et al., 2012; Prahalad; Ramaswamy, 2004b). Lately, service researchers have also begun to explore experiences from customers' daily lives, arguing important component of social context in the customers experience creation (Helkkula et al., 2012).

However, in public transport service, there still exists the confusion of who create experience, the service operator or the customer? The academic literature also exist fragment of when and where customer experience emerged. Especially by given the context of mobile technologies, which enable customer and company have innovative way of interaction in experience creation process.

In this paper, I reviewed the existing service literature of customer experience and expend to public transport service sector to examine whether customer experience creation differs in the context of mobile technologies. This would be done by answering two following research questions:

1. How to understand the different perspective of experience creation in public transport service?
2. What is the scope and temporal of customer experience creation in public transport service? Whether the use of mobile device changes such scope and temporal?

2 Customer experience

Customer experience can be defined as "the internal and subjective response customers have to any direct or indirect contact with a company" (Meyer; Schwager, 2007, p.118). Customer experience has received increased attention since Pine and Gilmore (1998) advocated a new era of experience economy came. Its focus has further developed to a more multi-dimensional and holistic view (Gentile et al., 2007; Verhoef et al., 2009; Carreira et al., 2013).

The holistic customer experience, according to Verhoef et al. (2009), formed through the search, purchase, consumption and after-sale phrases; involved different experience factors (e.g. social environment, service interface, retail atmosphere, assortment and price). Such experience factors can be defined as customer perceptions of all aspects of service that contribute to the customer experience (Carreira et al., 2013). Table 1 synthesizes factors found in the literature that can potentially be associated with travelling.

2.1 Three main perspectives of customer experience creation

After identifying the experience factors that may potentially form customer experience, it is essential to understand the subject who facilitates customer experience creation.

The traditional approach to customer experience creation mainly emerged from management practice and service design literature, which refers to management-oriented perspective (Berry et al., 2006; Zomerdiijk and Voss, 2009; Meyer; Schwager, 2007; Edvardsson et al., 2005). This perspective focuses on service providers' experience design, implementation and management capabilities. Accordingly, customers are invited to engage into the pre-designed customer experience stage to purchase experience subjectively. Therefore, firms need to create experience clues within the service process to attract customers' cognitions and responses to certain service. Such clues involves functional,

mechanic and humanic ones, according to Berry et al. (2006). From the point, customer experience creation is controlled under the service providers' capabilities.

The collaborative perspective argues experience has been co-created by both customer and service provider (Prahalad; Ramaswamy, 2004a), much in accordance with S-D logic (Vargo; Lusch, 2004). In this perspective, Teixeira et al. (2012) argue customer experience is not designed; rather it is co-created through customer interactions with service providers and the several service elements. Customer co-create unique experiences through their interactions with a service provider across different touch points, responding to the different designed elements, along with other elements that are not under an organization control, such as the social environment (ibid). Although this perspective confirms the customer initiative within the experience creation process, customer is argued still as invited to join company's value co-creation process.

The customer-oriented perspective posits the customers create their own experience with a service (Helkkula et al., 2012; Verhoef et al., 2009). This perspective, coherent with customer-dominant logic, views customers actively create their own service process and experience landscape by selecting service elements to achieve which experience they looking forward (Heinonen et al., 2010). Inline with this, customer experience is labelled as lived experience emerged from customers' daily life rather than pre-designed by company. Customers invite service providers to join their own value co-creation process rather than opposite.

2.2 Encounter and temporal scope of customer experience creation

The traditional management-oriented perspective views customer experience emerges within the customer-company encounters, where customer experience created at the interaction and purchasing stages (Berry et al., 2006). Such customer-company encounters include all major levels of one's consumption chains. The temporal scope of such experience creation based on all encounters with the service providers, both present and past (Zomerdijk; Voss, 2009).

The collaborative perspective widens the experience creation boundary through pre-, core- and post service encounters. The customer experience is co-created directly with the firm, or/and the other service elements and stakeholders within the service system (Teixeira et al., 2012). The temporal scope of customer experience creation has been viewed over the lifecycle of customer relationship, aggregated all previous and present experiences, rather than only service activities.

The customer-oriented perspective further broadens the scope of customer experience creation that takes into account of not only core service-related experience, but also non-related phenomena, such as social context (Helkkula et al., 2012; Verhoef et al., 2009). This perspective views the customer experiences in a customer context, based on past, present experiences and even future experience, which assumes experience as an ongoing flow of interrelated (Helkkula et al., 2012).

2.3 Customer experience creation in context of mobile technological

Inline with service-dominant logic, travellers create and perceive unique value and experience with close interactions with service providers (Vargo; Lusch, 2004; Kristensson et al., 2004). The combination of portable, personal, networked, textual/visual and converged characteristics of mobile devices enable customer to have closer interaction with service provider and other customers in real-time, and facilitate the customized travel experience (Lariviere et al., 2013).

The converged of technologies enables travels to check online time table before entering or standing at bus station (pre-service activities), get expectation of overall time and transfer methods before or during the journey (imaginary), keep in touch with friends through social network (social interactions), share positive or negative travel experience with friends or social people (post-activities), and do some personal work or read e-book (entertainment), to name a few.

The networked characteristic of mobile devices enable customer purchase multi-channel (online and offline) travel experience simultaneously. Users can optimize their journey by comparison of multiple travel routes or transfer methods together with real situation (multi-channel), or just forms an understanding of current situation.

The ability to communicate with text and visual content, somehow even audio and video information, enable users purchase better imaginary experience, and gaining insight into the circumstances of others, as well as sharing attractive experience.

With the label of personal assets, mobile enable customers to store large amounts of personal information. For instance, customers can create favourites to collect travel routes or bus stations to facilitate faster purchase previous travel information, which create value proposition for future experience (pre-service activities and post-service activities).

Last but not the least, portability characteristic of mobile device enables customer to practically carry out anywhere and use whenever it is needed. Therefore, customer can pick the service elements to choose experience to purchase.

3 Method

This study aimed at an in-depth understanding of customer perceptions and responses to address travel experience in the distinct context of mobile technologies, and as such, a qualitative approach was adopted. The qualitative method is

developed in the social sciences to enable researcher to understand certain social and cultural phenomena with a holistic view, which emphasis the researcher's opinions and explanations (Berg; Lune, 2004).

3.1 Data collection

Following the qualitative research strategy, interviews and focus group discussion are appropriate method to identifying factors that customers are able to verbalize. Before collecting the data with the passengers, I undertook several interviews with department managers and employees within a public transport operation corporate. The categorize of each journey route, transport operation process, customer reply process, mobile service platform design and other travel variables was made at this stage, in order to consider all factor of variability in each setting of customer observation and customer interviews. The customer interviews were done main at the metro station with the tool of Ipad. The semi-structured interview questions were uploaded online and downloaded through Ipad. The advantage of using Ipad as an instrument is its portable and auto-record function. Observation continued even during the interviews to notice every relevant aspect and non-verbal behaviour. The internal data about customer complaints and feedbacks were collected from the public transport operation company to have broaden view of customer feeling and experiencing even somehow mostly from negative aspects.

3.2 Data analysis

The process of data preparation and collection previously described which contributed to better understand about customer behaviour and emotional process that facilitate further data analysis. The interview texts were analysed line by-line and assigned provisional conceptual codes. The next step is the iterative search to bundle the codes into categories. The goal of such inductive and deductive process is systematic creating appropriate codes and categories. During this process the theory is allowed to emerge from the empirical data to have better understanding about travel experience.

4 Results

To get an in-depth understanding of travel experience based on distinct context of mobile technologies and social media, the study chosen three mobile apps addressing public transport service (Table 2). The main focus of the study is to understand whether the usage of such mobile device influences the scope and time boundary of travel experience. The interview samples comprised 19 passengers with the age of 20s and 30s, which were frequent transport users and transport-related mobile app users.

Table 2. Travel experience factors touched by selected mobile service.

Travel experience factors		Changzhou Pocket Bus	Kuaidi Taxi	Weibo
Related service (Supplementary service)	Information provision	X	X	X
	Intangible artifacts (e.g. mental images, brand)	X	X	X
	Multi-channel	X	X	X
	Staff's professional skills			
	Pre-service activities	X	X	X
	Post-service activities		X	X
Non-related phenomena (Non-travel service)	Entertainment			X
	Social interactions			X

To explore how mobile technologies influence travel experience creation through the lifelong period, I coded the interview results based on customer feelings and behaviours. After the comparison of passengers' travel experience in the context of whether or not using the mobile technologies, I coded the interview records while only discussed the difference factors or activities by using or not using mobile technologies. Results of three samples of mobile services were provided as following.

ChangZhou Pocket Bus is developed with the aim to increase the use of public transportation through access to real-time bus and BRT information (See Table 3). By searching from current location to destination, on one hand, passengers can select the suitable solutions for their travel need. The multiple travel routes transfer information and real-time table helps passengers to have better time management and have imaginary experience before entering the travel service. Alarm setting based on bus location provides reliable experience to, especially, office worker, who may sleep on the bus. Storing favorite bus lines and stations is like making key note after reading articles, which provide convenience for further experience purchase. The usage of mobile service let previous travel experience make sense to future experience.

Table 3. Travel experience enhancement based on Changzhou Pocket Bus Mobile service.

Within the context of mobile technology	Past experience	Pre-service	Service encounter	Post-service	Future
No	Bus travel experience.	Check the available bus lines at the bus station.			
Yes	Time saving. Smart decision making.	Check the available bus lines before or after entering the bus station. Multiple alternative travel routes. Automatic positioning.	Set alarm. Customer complaints and suggestions.	Add favorite bus station. Add favorite transfer method. Add favorite bus line.	Time saving. Personal travel setting.

Kuaidi Taxi is a crowdsourcing/service ordering mobile app, the location based service platform is helpful for citizen and taxi driver to have a mutual awareness of each other (See Table 4). It changes the interactive method between customers and company within taxi ordering method, therefore passengers could have an imaginary expectation about the time and location of taxi service. Passengers have more initiative to let taxi to join the passengers' travel plan rather than any other ways. The online payment method let passengers break the traditional taxi paying boundary, which is more suitable for passengers' personal behavior. Travel data history sometimes has other functions, such as searching for lost property. This mobile service providers the closer interaction platform between passengers and taxi drivers, compare to traditional taxi order method.

Table 4. Travel experience enhancement based on KuaiDi Mobile service.

Within the context of mobile technology	Past experience	Pre-service	Service encounter	Post-service	Future
No	Taxi calling experience.	Go to taxi rank and wait for taxi.	Payment time: Leave after paying. Pay as the Taximeter shows.		
Yes	Social Identity: Credit record. Travel cost reduces.	Accessibility: Taxi goes to customer. Convenience: Book a time. Imaginary: Make sense of the location of taxi.	Convenience: Payment time. Monetary value: using voucher.	Monetary value: get vouchers to use for next time.	Higher credit record. Taxi ordering knowledge. Review taxi ordering record (lost property).

Sina Weibo is a crowdsourcing microblogging website, has been widely used by public in China. Sina Weibo provides a large variety of information relate to customers' daily life, through the information source of text, visual, audio and video. Since most people use transport are not going to experience the transport but use it as a tool, many people would like to best use of the travel time to do some personal work or enjoy the on-boarding entertainment (See Table 6). The news and other information provided from Sina Weibo is chosen by each individual customer, which is more valuable than bus on board media based to the users. Rather than receiving information, customers themselves play as the we-media that generate information and sharing with others, especially during the travel time. This platform not only provides the channel for customer to complaint or gives feedback to service company, but let public open to assess such events. The both passive and negative participation into the social interaction let customer enjoy the travel experience, for the reasons of learning knowledge, achieve social identity and so on.

Table 6. Travel experience enhancement based on Sina Weibo Mobile service.

Within the context of mobile technology	Past experience	Pre-service	Service encounter	Post-service	Future
No	On board entertainment: mass media.	Collecting free newspapers.	On board entertainment: information source chosen by media company; already chosen.		
Yes	Enjoyable and fun. Knowledge increasing.		On board entertainment: information source chosen by customer.		Recommended news based on previous using record.

5 Discussion and conclusion

The combination of characteristics of personal, virtual, networked, and variety functions of mobile technologies enables customers and service providers to interact and communicate, produce and consume benefits and create experience in new ways.

a. Transform towards customer-oriented travel experience creation

Travel experience cannot pre-designed by service providers, but constructed varieties of service elements and platforms. From the customer-oriented perspective, passengers create their own travel experience through close interactive with all moments of contact with transport service, as well as some elements that outside the passengers' control (Verhoef et al., 2009; Carreira et al., 2013). In the transport sector, since the core service elements (e.g. service interface, assortment and price) are pre-designed by the service providers, which is uncontrolled by the customers, therefore the travel-related service (e.g. time and location information provision) and non-travel related elements (e.g. social and purpose of travel) plays important role in forming better travel experience. Among the large volume of information resource available online, customer have initiative to pick the service elements as they wish. Therefore, service providers' responsibility to support passengers' travel experience formulation is to provide structured service information, and attract customers' cognitive, affective, emotional, social and physical response to such travel service elements.

One important way to attract and motivate customers to engage in the travel experience is to provide more service elements that previously cannot be controlled now available to the customers. Further, let customer get such awareness. For most passengers, travel experience is based on the utilitarian trip (Carreira et al., 2013), provide convenient interface platform, multiple channel and interactive with other service of customers' daily life can enhance passengers' travel experience. Rather than emphasis humanic element to cultivate customer experience in other service sectors (e.g. retail), in transport service, the shorter waiting time, or in other words, optimize the linkage between transport service to others can maintain travel experience level.

b. Scope and temporal changes in the context of mobile technologies

With the help of mobile technologies, the scope of travel experience was expended compare to traditional travel method. Based on the mobile technologies, passengers can purchase of imaginary and lived travel experience simultaneously through multi-channels (online and offline). For instance, customer monitor the taxi's real-time moving route on the taxi to check whether the taxi driver chosen the detours. Moreover, mobile technologies extend the customers' social interaction scope. Such social interaction can be not only active information searching, but also passive information receiving. The sharing experience of real-time experience with society can somehow benefit passengers' travel experience, vice versa.

The temporal boundary of holistic travel experience is expanded into the customers' life-long context (Helkkula et al., 2012). However, this ongoing flow of travel experience mainly based on feelings, understandings and such emotions components (Verhoef et al., 2009; Helkkula et al., 2012), which is hard to identify by others. By using the mobile technologies, travel experience track can be recorded within a history fold. At least, some intangible travel experience becomes tangible, that provides certain clues to service providers for smart decision making recommendation.

6 Practical implications

Transport practitioners should design different service platforms to let customers create experience by their own initiative. The record emerged through such service platforms can be helpful to have broaden understanding of customer behaviour.

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The role of Public-Private Innovation Networks in the development of smart city services: an exploratory analysis in Europe

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This paper contributes to the understanding of networked innovation for the development of smart city services by leveraging the interpretive potential of Public-Private Innovation Networks in Services (ServPPINs). A conceptual framework is proposed to explore the structure, process and dynamics of “smartServPPINs” and the drivers influencing their functioning and role in realizing technological and non-technological innovations for cities’ smart development. Then a comparative analysis of two European case studies of smart projects and their related service innovation networks is conducted based on the framework, showing its contribution in disentangling the complexity of these collaborative arrangements.

1 Introduction

Recent years witnessed an increasing interest in cities’ strategies and efforts to become smart in response to the societal challenges of sustainable socio-economic and urban development, global competitiveness and improved quality of life. Smart city initiatives involve innovative approaches to develop advanced services in various areas of the city life that are relevant to the needs of the users and the urban environment (Paskaleva, 2011; Nam; Pardo, 2011b). In this direction, several studies point to the importance of partnerships and networks involving private firms, non-market organisations and citizens for the development of smart city innovations (a.o. Komninos, 2006; Schaffers *et al.*, 2011a, 2012; European Parliament, 2014). However, theoretically grounded efforts to understand these complex collaborative arrangements at the crossroad of urban, social and service innovation are still limited. This paper aims at providing a contribution in this direction by leveraging the interpretive potential of the service innovation perspective, namely the concept of Public-Private Innovation Networks in Services (ServPPINs). Recent literature on innovation in services emphasizes the role of these flexible inter-organisational structures between public, private and third-sector organisations for the development of new or improved services, also within the context of public services (Gallouj *et al.*, 2013a; Djellal *et al.*, 2013; Weber *et al.*, 2014). We argue that ServPPINs can provide a useful lens to advance the understanding of collaborative innovation within the complex landscape of smart cities, by properly addressing the complexity of interactions between public and non-profit stakeholders, private firms and users/citizens communities for the development of innovative solutions in response to urban and social needs. Based on research on collaborative innovation in smart cities and on ServPPINs, a conceptual framework is proposed for exploring the nature and role of ‘smartServPPINs’ in realizing opportunities for technological as well as non-technological innovations in the smart city context and the factors influencing their operation and performance. Specifically, the framework identifies a set of nested components for understanding the drivers, structure, dynamics and outcomes of smartServPPINs. On the basis of this framework, a qualitative exploratory analysis of successful public-private service innovation networks in European smart cities is conducted. The empirical analysis aims at shedding light on their features and at identifying the conditions influencing their role in the development of innovations for cities’ smart development. The paper is structured as follows. The next section examines the literature on innovation in the smart city context, highlighting the importance of collaborative arrangements based on the interaction among a variety of stakeholders for developing new and improved city services. Moreover, the main issues and gaps are considered in relation to the analysis of collaborative arrangements in the smart city context. Section 3 introduces the service innovation perspective, notably the ServPPIN concept, as a useful lens to advance the understanding of the complex nature and functioning of public-private innovation networks in smart cities. Against this background, Section 4 presents a conceptual framework for exploring smartServPPINs, which identifies the key components to be investigated for understanding the role of innovation networks to realize new smart city services and the factors influencing their effective functioning. Section 5 presents the results of a comparative analysis of two European case studies of smart innovation projects and the networks associated to them, which is aimed at validating our framework as well as at providing an empirical contribution to existing (but still scanty) knowledge about the characteristics and role of what we labelled smartServPPINs. Finally, in the last Section some conclusions and directions for future research are provided.

2 Enabling the smart city: the role of collaborative innovation

In recent years, the concept of ‘smart city’ has attracted an increasing attention as many cities worldwide have started to develop strategies and initiatives to manage in a more effective way the complexity of urban living and development within the social, economic and environmental domains. Notwithstanding the multiple uses of the term and the lack of a shared definition, a smart city is quintessentially enabled by innovative approaches in urban areas that are based on the symbiotic connection of people, businesses, institutions, technologies, infrastructures and spaces (Nam; Pardo, 2011a;

European Parliament, 2014). Indeed, many studies in this area point to the importance of embracing an open perspective to city innovation, emphasizing a wide range of collaborative models and approaches (e.g. districts, clusters, public-private-people partnerships, living labs, open data, e-governance), which links local government, research institutions, universities, companies, third-sector organizations and citizens into an innovation ecosystem for developing more inclusive, higher quality and efficient services (Paskaleva, 2011; Zygiaris, 2013; Komninos *et al.*, 2013; Schaffers *et al.*, 2011a). Also the current European Commission programs FP7-ICT and CIP ICT-PSP stimulate experimentation into smart cities as open and user-driven innovation ecosystems for designing and piloting innovative solutions based on the collaboration between citizens, firms and local governments (Schaffers *et al.*, 2012). In this respect, Schaffers *et al.* (2011a) distinguish two different layers of collaboration in smart city innovation ecosystems. The first concerns collaboration within the innovation process between research, development, validation and utilisation, with the innovation projects carried out within smart cities being the typical arenas to explore these interactions. The latter concerns collaboration at the territorial level, significantly driven by urban and regional development policies aiming at strengthening the “urban value creation system”. At this level, the creation of effective conditions for innovation is affected by a number of factors, including physical and immaterial infrastructures, entrepreneurial climate, demand for services, policy interventions aimed at stimulating the enhancement of innovation capabilities and the creation of sustainable partnerships among the main stakeholders from business, research, policy and citizen groups. Clearly, both levels of collaboration and their interaction are important to foster the development towards open innovation for smart cities. However, available studies seem to focus either on collaborative approaches at the second level, stressing above all the key role of public-private partnerships (PPP) in urban planning and infrastructure development (e.g. Bevilacqua *et al.*, 2012; Ng *et al.*, 2013; Bakici *et al.*, 2013), or on interactive and user-driven models of innovation, with a particular emphasis on the potential of living labs for co-creating new city services (e.g. Schaffers *et al.*, 2011b; Pallot *et al.*, 2011; Paskaleva, 2011). Moreover, available studies on collaboration for innovation within smart cities are mostly technology-oriented, focusing on its outcomes in terms of new technologies and e-service applications. While technological innovation is a necessary condition to make a city smart, the development and adoption of up-to-date technologies *per se* does not guarantee the success of smart cities initiatives. Indeed, as Nam and Pardo (2011b, 190) underline, the challenge of smart city innovation is not primarily on technology, but on service transformation and improvement, since “the ultimate goal of a smart city is to enhance the overall quality of city services”. This calls for a more comprehensive view of innovation, including also the non-technological human, organizational and political changes associated with the innovative fulfilment of city’s service demands (Nam;Pardo, 2011b). Such a broader view is in line with the concept of social innovation, which is increasingly emphasized within current smart city programs and initiatives (e.g. URBACT II, Periphèria, Human Smart City movement). A core concept to social innovation for smarter cities is the co-production of socially innovative solutions to urban problems with a strong involvement of citizens and non-governmental associations and the diffusion of innovative models of cooperation and social relationships to improve service quality (Ramsden, 2012). By this brief review, it appears that further understanding of the complex nature and role of collaborative innovation in the smart city context would benefit from additional efforts to better take into account the interplay between the different layers of collaboration, the collaborative arrangements involved in innovation processes and the non-technological, social dimensions of smart city innovation.

3 Public-Private Innovation Networks in Services: advancing the understanding of smart city innovation

Recent literature on innovation in services has focused on the role of interactive structures and processes in relation to a general open innovation perspective covering a range of cooperative models (Gallouj; Djellal, 2010). These include Public-Private Innovation Networks in Services (ServPPINs), which involve collaborative partnerships between public, private and third-sector actors for developing, producing and delivering new and/or improved services. ServPPINs are flexible collaborative structures that support the exploitation of complementarities and synergies among different organisations, the integration and sharing of dispersed knowledge, technology, competences and potential risks in uncertain innovation processes. These inter-organizational arrangements are a specific type of innovation networks, being characterised by three fundamental features (Gallouj *et al.*, 2013a): firstly, the interaction between public and non-market actors and private actors occupies a central role; secondly, service providers act as the main actors in the networks; and, finally, they build upon a broad conceptualization of innovation, including also non-technological forms (i.e. organizational, process, cognitive, conceptual, network-based). Moreover, they are ‘naturally’ characterized by customer/user interactivity and involvement in innovation processes, given the endogenous role of customers in service co-production. The relational configuration of ServPPINs can widely vary depending on the actors involved, their role and the degree of formality of relationships among them. Further, it is subject to change during the networks’ lifecycle, which can be described in terms of the three main phases of initiation, emergence and wider implementation or uptake (Green *et al.*, 2013; Weber *et al.*, 2014). Empirical research on the structure and operation of these networks in transport, health, tourism, knowledge-intensive services highlights that their success is determined by four main interrelated sources (Rubalcaba *et al.*, 2011): a) the role of both internal and external drivers, including trust, pro-innovation culture, leadership, a right strategy between bottom-up or top-bottom approaches, financial and political support, technological opportunities and policies concerning innovation, public procurement, employment and skills, sectoral development; b) the integration within wider systemic and social networks; c) the ability to overcome barriers

in areas such as the rigidity of public administrations, the existence of different interests and incentive systems, free riding, asymmetric information and networking competences, appropriability; d) the reduction of evolutionary inefficiencies, concerning the risk of not being efficient enough to adapt to the changing phases of networks' lifecycle. Recent studies have emphasised ServPPINs as a viable means for approaching, from a network-based perspective, a field of innovation that is still largely underexploited, namely innovation in public services (Djellal *et al.*, 2013; Weber *et al.*, 2014). Indeed, research in this area pays a growing attention to innovation models for the public sector, given the increasing complexity underlying the goal of public value creation for service users, citizens and society as a whole in an era of economic and financial crisis where traditional mechanisms of public provision such as the State and the Market are no more adequate. In particular, it is highlighted that innovative solutions to modern challenges can be effectively developed, promoted and maintained through multi-actor collaborative structures that enable public, private, third-sector and civil society actors to interact in a complementary and synergistic way in joint innovation processes (Weber *et al.*, 2014). In this viewpoint, ServPPINs have been suggested as a viable alternative for realising innovations to existing models, such as outsourcing of public service provision and contractual PPPs. Moreover, it has been shown that these structures represent a suitable organisational mode for social innovation, facilitating the collective creation process necessary for the development of new solutions to societal needs (Djellal; Gallouj, 2011; Rubalcaba *et al.*, 2013). For their features, ServPPINs can thus be as a valuable concept to explore innovation networks in smart cities and advance the understanding of key factors influencing their effective operation and their role in realising innovations for cities' smart development. Indeed, these new inter-organizational arrangements describe the way in which multiple public, private, third-sector and civic actors interact to produce not only technological innovations but also social innovations. Thus, they allow to address public-private collaboration for innovation through a more holistic view, by taking into account the complexity of networked innovation processes in the context under examination in terms of actors' heterogeneity, relationships' dynamism and variety of innovation outcomes.

4 A Framework for Exploring Public-Private Service Innovation Networks in smart cities

Drawing on studies in the field of collaborative innovation in smart cities, ServPPINs and previous research (Errichiello; Marasco, 2014), a conceptual framework is proposed for disentangling the complexity of smart service innovation networks (smartServPPINs) and understanding their role in realizing opportunities for service innovations. The framework (Figure 1) identifies a set of nested components that include: 1) the structural features, processes and dynamics of the network; 2) the innovation outcomes produced at various levels; 3) the broader smart city innovation context; 4) the networking regime related to a given smartServPPIN.

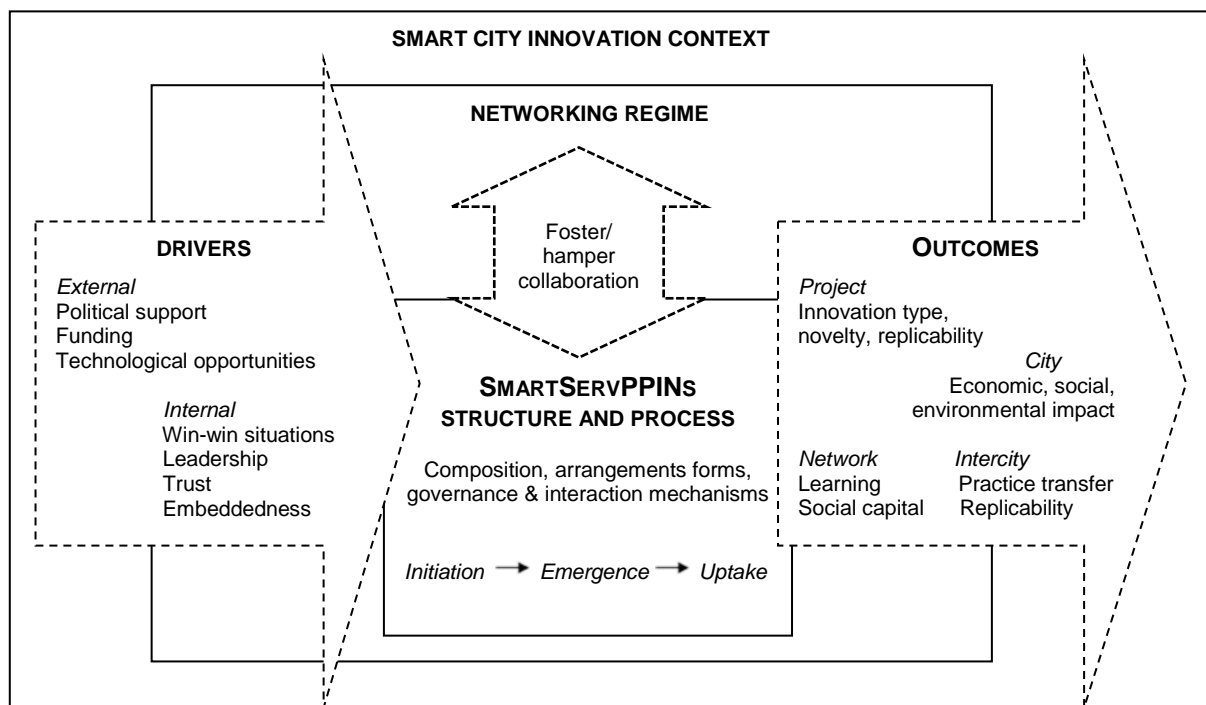


Figure 1. The conceptual framework.

The first component concerns the *smart city innovation context*, which creates opportunities and constraints for networked innovation influencing the general features and properties within which specific ServPPINs develop and operate. Major components of this broader context include (Schaffers *et al.*, 2011a; Rubalcaba *et al.*, 2011; Weber *et al.*,

2014): features of the general political and institutional environment at the city level, i.e. laws, regulations, policy interventions and government investments, which can shape and foster infrastructural/technological development, employment and skills, entrepreneurship, innovative conditions, collaboration; cultural and social norms, in terms of business climate, entrepreneurial spirit or the diffusion of a pro-innovation culture at the urban level; level of commitment and strategic action along one or more smartness areas (i.e. smart economy, smart mobility, smart environment, smart living, smart governance, smart people) directly affecting the overall “endowments” of a smart city (Giffinger; Pichler-Milanovic, 2007) and reflecting different degree of integration, coordination and interaction capabilities of local stakeholders (and the public actors in particular) in managing smart initiatives and projects (Achaerandio *et al.*, 2012). The smart city innovation context influences the evolution and performance of smartServPPINs from their outset and over time, providing the key external drivers for the initiation of a given project and the related collaborative network, its development along a specific trajectory and its effective operation. In this respect, empirical research on ServPPINs has identified a number of key driving forces that, according to our framework, can be considered as emerging from the broader smart city innovation context. These include (Gallouj *et al.*, 2013a): technological and market opportunities, customer demands, environmental concerns, concrete actions from public or semi-public institutions in the form of programmes, institutional/political support, semi-public coordination, financial incentives and funding opportunities for specific projects. In the smart city context, in particular, the ‘public mission’, i.e. the intention to improve the quality and efficiency of city services, can be viewed as a key driver in all those cities actively involved in the implementation of a smart development plan. Next to city-level conditions, the smart city innovation context also includes ‘inter-city’ factors that reflect the positioning of a city in a broader arena where other cities are actively engaged in implementing smart development programmes. In this respect, an important factor is represented by the level of rivalry among cities aspiring to become ‘valuable practices’ of smart city development. Indeed, this factor can directly influence cities’ capability and effort to access financial or knowledge resources that are assigned to specific smart initiatives and projects through competitive schemes.

The second component, namely the *networking regime*, includes the set of relational conditions that can foster or hamper networked collaboration at the project-level. This can be connected to the overall atmosphere of the relationships¹⁷⁶ (among network members) *à la* Håkansson (1982), which arises from the overall state of closeness or distance, power-dependence, conflict or cooperation and mutual expectations of the parties involved in a specific smartServPPIN. On the one hand, this component is embedded in (and thus is conditioned by) the broader smart city innovation context, which actually influences the openness of firms’ towards collaboration and their innovation capabilities; on the other hand, it includes a number of internal conditions that influence the dynamics and performance of the innovation network with variable intensity and often in combination. The networking regime provides key drivers for the initiation of a smartServPPIN that can be considered sine qua non conditions of collaboration, but remain essential throughout the innovation process. These include (Bryson; Crosby, 2006; Emerson *et al.*, 2011; Gallouj *et al.*, 2013a; Weber *et al.*, 2014): leadership, commensurability and non-rivalry of needs and interests, complementarity of competences. As for mutual trust, although it is widely recognized as a precondition for initiating collaboration at the inter-organizational level, innovation networks can also start with low degree of mutual trust. Indeed, what is crucial for successful collaboration is the capability of trust building along the innovation development process (Ring; Van de Ven, 1994; Vange; Huxham, 2003). Similarly, prior relationships or integration in existing social networks at both local and extra-local level (*structural embeddedness*) - though not always required for the initiation of a smart city project - can facilitate the formation and maintenance of collaborative innovation networks since it is often through them that actors can judge the trustworthiness of other potential partners (Ring; Van de Ven, 1994; Bryson; Crosby, 2006), increase their attitude towards risk-taking and a pro-innovation orientation. However, the influence of the collaborative regime on the smartServPPINs dynamics and performance is not unidirectional. Indeed, over time, the network itself affects the emergent features of the collaborative innovation regime, since it contributes, for example, to accruing the capability of the parts to exploit complementary skills, to maintaining commitment towards a common goal, to reducing unbalance between firms (e.g. large firm dominating), to conciliating different culture, interests and competences (e.g. among public and private actors).

The third dimension relates to the *structure and process* of smartServPPINs, which can be described in terms of actors’ roles, their competencies and contribution to the different stages/activities of the innovation process, the forms of arrangements, the governance and interaction mechanisms. These arrangements can vary widely, for example, depending on the number and type of actors involved, which can be from the public administration, the policy-making area, the research system, the private business sectors, the third-sector, the civil society. It is to be noted that often smartServPPINs have an open ‘geographical’ character that goes beyond the boundaries of the city, because they include actors from other cities and regions that are gathered together by the same transnational project and funding. For

¹⁷⁶ The concept of atmosphere is part of the Interaction Model developed by the Industrial Marketing and Purchasing (IMP) Group to understand the interaction process in dyadic relationships and the embeddedness of these in industrial networks. In this model, the interaction occurs within an atmosphere arising from the closeness, dependency, expectations and cooperation of the parties, and is further contained in a larger environmental system. In his seminal work on the Interaction Model, Håkansson (1982, 29) notes that the variables related to the atmosphere “are not measured in a direct way in this study. Instead, the atmosphere is considered as a group of intervening variables, defined by various combinations of environmental, company specific, and interaction process characteristics. The atmosphere is a product of the relationship, and it also mediates the influence of the groups of variables”.

example, this is the case of the transnational innovation networks that participate to the several European smart city projects aimed at transferring and testing innovative solutions in each of the partner cities (e.g. Genius Open – URBACT; CitySDK – ICT PSP; Open Cities - ICT PSP). Moreover, their initiation can be based on a top-down approach, driven by public action, as well as by bottom-up initiative, based on the voluntary engagement of other actors. Further, these arrangements can be characterized by a ‘caretaker’ mode, in which one actor plays the role of conductor, hub actor or systems integrator, or by a ‘distributed’ nature, in which responsibilities are more diffused among the actors (Galloway *et al.*, 2013a). Overall, the structure and process of smartServPPINs need to be considered in a dynamic way, in order to take into account the evolution of the network over time that can be described as a life-cycle (Green *et al.*, 2013; Weber *et al.*, 2014), distinguishing between the three main phases of initiation, emergence and uptake. The first one is characterised by the development of a shared vision among partners of needs, benefits, contributions as well as of the basic operating mechanisms; the second phase involves the full operationalization of the network along with the finalisation of agreements, the establishment of more sophisticated and practical structures and processes, agreed roles, lines of communication, milestones, leadership, and decision-making; in the third phase, the goals of the network have been achieved in the case of successful network formation and the network could be terminated or continued in a further project where opportunities exist. Throughout these phases, smartServPPINs are likely to change and evolve along most of their dimensions, including composition, roles of actors, governance/communication mechanisms, networking regime, external and internal enablers.

The final component of the framework reflects the short-term and long-term *outcomes* of smartServPPINs, which can be conceptualized through a multi-dimensional and multi-level categorization. Specifically, we can identify innovation outcomes at four interrelated levels: 1) the innovative solution realized through the project; 2) the network; 3) the city; 4) the intercity level. As to the first level, the type of innovation (technological, non-technological), its degree of novelty and replicability are the most significant elements to consider. Developing new technological solutions, such as electronic management systems, digital platforms and e-service applications is a key objective for many smart city initiatives. However, the development of new technological applications in smart city projects is often the enabling condition for other (central) innovation outputs: *service innovations* in different smartness fields, i.e. the development of new or improved services for city users, such as new energy-efficient services (smart environment), e-car sharing and e-bike services (smart mobility); *social innovations*, i.e. the behavioural change of citizens (e.g. the reduction of their energy consumption) or the community involvement in public decision-making; *network-based innovations*, when the main goal of the project is the establishment of a new collaborative arrangement between private and public organizations. The replicability of the innovative solution is linked to the possibility of increasing the size of the related project by involving more stakeholders (also from different cities), funding and services (scaling of the project), or extending the geographical area of application/adoption of the solution within the same city or, more ambitiously, in other smart cities (European Parliament, 2014). At the network level, the main innovation outcomes can be primarily measured in terms of acquisition of new skills and competences by participants in the innovation network (learning) and increased social capital, especially in the form of accrued mutual trust. Acquiring new knowledge is key for both private and public organizations, since it increases their innovation capability and foster knowledge transfer across different innovation projects (i.e. a specific partner would operate as a knowledge gatekeeper from one project to another). In a similar way, if trust building is a matched goal of project-based collaboration, this will reveal a crucial intangible asset for starting new innovation projects with the trusted partners. At the city level, the overall goal of any smart city strategy would always be to realize significant economic (e.g. new job opportunities, new businesses), social (e.g. better health, timesaving, democratic governance) and environmental (e.g. energy saving and lower Co2 emissions) outcomes through a portfolio of relevant initiatives and innovation projects. Finally, at the intercity level, the main outcomes derive from the possibility of benefiting from the practice transfer and learning from new and different environments. This can yield, among others, opportunities for a better assessment of the suitability of innovations for different circumstances and for improving their replicability and dissemination.

5 A comparative analysis of European smartServPINNs

Against the background of this conceptual framework, an exploratory empirical analysis was conducted based on two European case studies. Specifically, two smart city projects and the innovation networks associated with them have been analysed and compared in order to confront our framework with empirical evidences and add new insights on the nature and role of ServPPINs in the emerging and complex smart city landscape.

5.1 Method

The empirical investigation has been conducted through an explorative multiple case study analysis (Eisenhardt, 1989; Yin, 2003). This method allows in-depth insights into emerging fields and is particularly suitable for addressing ‘why’ and ‘how’ questions of the phenomenon under investigation (Yin, 2003). Therefore, it has been selected as the most appropriate method for addressing our research goals. In more detail, the first objective is to validate our framework for exploring the characteristics and role of ServPPINs in the implementation of smart city innovation projects. In this respect, in-depth case study analysis is aimed at showing how the complexity of these organizational arrangements can be disentangled by focusing on a set of nested components that encompass: 1) the structural features of these innovation

networks as well as their dynamics; 2) the innovation outcomes produced at various levels; 3) the broader smart city innovation context, which creates the general environment within which specific ServPPINs unfold over time and provides external drivers for their formation and up-take; 4) the networking regime, which creates the set of conditions of collaboration at project level and provides the internal drivers of smartServPPINs. The second objective is to provide an empirical contribution to advance existing knowledge on the characteristics of smartServPPINs, their set up and governance, and the relative importance of different drivers for the successful development of innovations for the smart transformation of cities. The case study analysis allows us to gain new knowledge about the functioning ('how' and 'why') of public-private service innovation networks through a deeper analysis in the smart city context.

The analysis is based on two case studies conducted by the authors within a broader research project that considers a number of European smart cities and focuses on several innovation projects within each of them. The selection of the cases was carried out at two different levels: the smart city level and the project level to which service innovation networks are associated. As to the first level, two cities being strongly committed and engaged in a *smartification* process have been identified among a list of European best practices, which was compiled on the basis of available rankings, indexes, awards (including Ranking of European Medium-Sized Cities; Between Smart City Index; IDC Smart City Index; IESE Cities in Motion Index; World Smart City Awards). The fact that the two cities have both a formal 'smart strategy' plan and that innovation projects are part of a broader public mission towards the smart development of the city allows us for comparison. However, the two cities present differences in terms of focus, number and integration of initiatives and projects carried out under the smart city 'umbrella'. This allows us to examine the influence of the specific smart city innovation context on the development and operation of the two smartServPPINs under examination. With regard to the second level, this study adopted the selection criteria developed within the European FP7 Project ServPPIN - *The Contribution of Public and Private Services to European Growth and Welfare, and the Role of Public-Private Innovation Networks* (Gallouj *et al.*, 2013a): (1) the cases have a concrete innovation aiming at the improvement in service characteristics; (2) there is a constellation of public-private organizations that is central to the realization of the innovation in focus. Consistently with these criteria, we selected two cases: the Climate Street (*Klimaatstraat*) project in Amsterdam (The Netherlands) and the Love City Index project in Siracusa (Italy).

Climate Street (CS) represents a flagship innovation project among the official pilots of the Amsterdam Smart City Program, whose primary goal was the reduction of CO2 emissions and energy consumption in a popular shopping street (the *Utrechtsestraat*) so as to improve its sustainability and its attractiveness for city visitors. The pilot was conceived as a small scale city demonstration and a testing pilot for a portfolio of sustainable innovations and advanced energy saving technologies (sensor monitoring systems for efficient energy management, smart solutions for public spaces, sustainable waste logistics innovations). The pilot was launched in 2009 by the Amsterdam Smart City (ASC), which is a public-private partnership set up to stimulate and advance local innovation projects aimed at testing and developing smart technology solutions focused on energy transition and open connectivity. Initiated in 2009 by the Amsterdam Economic Board (a not-profit public organization), the City of Amsterdam and two private companies, ASC has grown over two years to include more than 70 partners among businesses, authorities, research institutions and the citizens and more than 20 pilots. Among these formal projects, CS has been established as an international best practice of smart initiatives oriented at maximum energy efficiency and minimum environmental impact in the city and it is widely considered as a blueprint for other European cities (Amsterdam Smart City, 2011). The success of the project and its replication potential is also proved by the subsequent development of the smart device "Quby", an energy management system awarded with the 'Smart Grid Innovation Awards 2011' and implemented by 30 entrepreneurs in the Climate Street. Indeed, through the testing phase and end users' involvement, not only the Quby Owner (Home Automation Europe) further developed the device and scaled up its product abroad, but also one of the big energy companies in the Netherlands (Eneco) currently offers the Quby device free to its customers. The *Love City Index Siracusa* (LCIS) project was developed after that in 2012 the city of Siracusa was selected as the only Italian one for 'Smarter Cities Challenge', IBM's global competitive grants program that funds the deployment of IBM's top experts to cities' worldwide to help them address critical challenges and become smarter. During three weeks in June 2012, a team of six IBM experts worked in the city to deliver recommendations on the key challenges identified by the municipality, after analysing all relevant data and reports and meeting several representatives of local stakeholders (public actors, private firms, non-profit organisations, associations, citizens). Based on IBM team's findings, six fundamental 'pillar' recommendations were developed together with various projects that lay out how each recommendation could be achieved. In particular, one of them is directed to improve the tourist infrastructure and services, concentrating on understanding tourism needs and behaviours (IBM, 2012). In line with this goal, in September 2013 the LCIS project started with the purpose of developing a new mobile application, which is meant to be not only a digital guide for city visitors, but also a tool to engage them in the preservation of Siracusa's outstanding cultural heritage, which is part of the UNESCO World Heritage List. Through the three functionalities of the app (*Know-Feel-Act*), the user can get information about the selected point of interest (e.g. history, visiting hours, contact references, best next places around); communicate and share his/her feelings ('love') in front of the visited place; and, give his/her own opinions, suggestions and comments as an 'expert evaluator' to preserve Siracusa and its heritage. The 'buzz' and suggestions generated through the app are evaluated through social analytics in order to detect the Love Index of the city and give the public decision makers valuable information on the actions to be taken to preserve the sense of love people feel and improve the local tourist/cultural services. The first release of the Love City Index app (LCISiracusa) includes more than 60 points of interest in three different categories (Products, Landscapes, Buildings and Places) and received in 2014 the

Smart City Award at the most important Italian event dedicated to ICT (Smau). Siracusa municipality is actually engaged in the up grading of the app to extend the service to 1000 points of interest all over the surrounding territory.

Data about these cases were collected through a combination of sources, including secondary sources (reports, press articles, projects material, websites) and a series of semi-structured interviews with key actors, i.e. projects' leads and members of organisations involved in the projects. The interviews were conducted in the period May-July 2014, based on a semi-structured interview guide aimed at gathering information on the role of different actors in the network, the relationships among them, the governance and information mechanisms, the drivers and barriers to collaboration in the smartServPPINs, the short-term and long-term outcomes. Collected data were then compiled along the components of the framework in order to compare the information from the cases.

5.2 Results and discussion

In this section the selected smartServPPINs are analyzed and compared according to the framework's components. Looking first at their structures and processes, the two cases differ significantly in terms of composition, modes of inducement, governance structures and dynamics. In more detail, the network associated to the CS project was quite broad and diversified, including 19 partners from both the public and private sector. Private companies were mostly technology providers operating in different sectors (e.g. utilities and infrastructures, telecommunications, logistics) and included local providers and techno startups next to international players, such as Vodafone and Philips. However, the smartServPPIN was initiated by a small core team of partners: Amsterdam Smart City; Van Gansewinkel, a local waste collecting private company; Club of 30, a project organization specialized in the implementation of sustainable operational process solutions that was formally given the role of project management by ASC; the young Utrechtsestraat Business Association, involving all the 120 entrepreneurs of the street and represented by the shopping street manager. The formation of the innovation network was driven, through a bottom-up approach, by the decisive action of Van Gansewinkel that proposed the idea for the project to ASC, the shopping street manager and the association of local entrepreneurs. Involving the end-users (the entrepreneurs) in the innovation network as formal partners was the main goal of the initiators, since a number of technological innovations (including smart grids, energy scanners and smart meters) needed to be tested through real-life, daily use at the entrepreneurs' workplace, i.e. bars, restaurants and local shops in the street. At the same time, their involvement was necessary to achieve the long-term goal of the CS project, namely the change of end users' behavior and patterns of energy consumption. Beside the local entrepreneurs, the choice of the cooperation was predetermined (path dependent) only for Van Gansewinkel that previously collaborated with the municipality of Amsterdam and for Club of 30, which was directed by the prior commercial director of Van Gansenwinkel when the project was formally launched. For the vast majority of private companies that joined the project as development partners, the forms of partner selection corresponded rather to the supply chain type of the network (Schartinger, 2013). Specifically, the contributions of most partners did depend much upon their specific resources, i.e. finance, market knowledge as well as technology-based services to showcase in the street. Other network partners, such as utilities and infrastructure providers were selected by a call for tender based on their technical know-how and resources. As for entrepreneurs, only a small group of 40 inspired and motivated entrepreneurs was initially involved in the pilot and was formally given the role of "frontrunners" for individually testing new technologies and working together in the co-development of the CS concept. In the LCIS case, the project was associated to an innovation-oriented PPP, which can be considered a specific case of ServPPIN (Gallouj *et al.*, 2013b). The partnership was composed of the Siracusa municipality and the IBM Foundation Italy, a non-profit organization instituted by IBM for promoting technological innovation projects on the themes of culture, education, labor and social problems and providing financial as well as operational support to organizations and institutions working in these fields. This partnership was created in continuity with Siracusa participation to IBM's Smarter Cities Challenge by the joint initiative of the municipality and the IBM Foundation. Therefore, its initiation was essentially driven by public action (top-down approach) and based on a previous, positive relationship between the partners. The partnership operation was characterized by the distributed nature of responsibilities that well reflected actors' competences. In more detail, IBM Foundation Italy funded the project and involved the IBM Human Centric Solution Center for the R&D supervision and the technical development of the app's architecture. The municipality coordinated the project jointly with IBM Foundation Italy and participated to the development phase for the creation of the app's contents. In the project's final stage, the municipality involved the local Impact Hub¹⁷⁷ for collaborating with the partners (IBM Foundation Italy and IBM Human Centric Solution Center) in the presentation and promotion of the app. Impact Hub Siracusa was created in 2010 by a public-private initiative (a.o. Siracusa municipality, Catania University, Association of Cooperative Companies) within the European project Euro-South Hub. Since then, the Hub participated to several projects, contributing with its network of relationships and experiences of collaboration facilitation. Thus, in both cases the core network was formed by PPPs based on previous relationships that developed with the aim of leveraging the complementarity of competences and the possible synergies among the partners. Moreover, they are commonly characterized by the key role of multinational technological players (IBM, Philips, Vodafone) in the

¹⁷⁷ Impact Hub is a shared work and event space for a global community of entrepreneurs, activists, artists, and professionals using the power of business to drive positive social and environmental change. The first Impact Hub was founded in London in 2005 and has evolved into a rapidly expanding global network of over 7,000 professional members in 60 cities.

technological development of innovative solutions. This is not surprising in consideration of the smart nature of these networks and the related technological and market opportunities for these big firms. In the CS case, for example, it is difficult to assume that these technology providers would have joined the project without a strong belief in the high potential offered by ICT-based solutions to improve energy efficiency and reduce CO2 emissions. Another common feature across the cases is the relative stability in the networks' composition and actors' roles along all the life cycle of the projects though they have different durations - two years for CS and three months for LCIS, respectively. This is particularly relevant in the CS case, where the network stability significantly mattered to drive the ServPPIN forward and to ensure its success in achieving the expected goals. Such a structural strength of the network is likely to be connected also to the well-structured approach adopted by the core team in the pre-initial phase of the project, which relied on the mapping of all the relevant stakeholders, the rigorous assessment of the potential environmental impact of the project and, finally, a dedicated effort to communicate to different stakeholders the relevance of the project's goals so as to ensure their partnering and collective commitment to the project. As highlighted by the project leader, *"Different groups have different targets....You have to make sure that everyone is aware that you can reach your own target only with cooperation with each other...it takes a lot of time and effort to keep everyone committed, especially the entrepreneurs"*. Moreover, another relevant feature of CS smartServPPIN potentially contributing to its stability and performance was the adoption of a formal governance structure based on the creation of a dedicated entity - a steering committee representing all the partners - that centrally coordinated key decisions and activities. By contrast, the governance of the LCIS case was characterized by a shared but informal structure, with the two partners working jointly without an *ad hoc* administrative entity. This difference in the structure can be due also to the diverse scope of the two smartServPPINs, with the former posing greater governance challenges for the high number and variety of members.

With regard to the outcomes of the networks, in both cases the development of new technological applications was the enabling condition for other (central) innovation outputs. Specifically, CS can be considered as a complex 'architectural innovation' (Gallouj; Weinstein, 1997), where the change effort of a multi-agent interacting system is oriented at the co-production of different forms of technology-mediated and non-technological service innovations. The first types of innovations are closely connected to new technology products, solutions or devices (e.g. the Quby energy display) and offer new or improved services to city users (e.g. energy consumption information services, logistics services, LED-based lightening services). Non-technological innovations are social in nature, since the project also aimed at producing a change in the awareness and patterns of energy consumption of end users' (e.g. entrepreneurs and citizens). Also in the LCIS case, the technological output (the LCI Siracusa App) can be associated to a social innovation, being aimed at stimulating a behavioural change of users (awareness and responsibility towards the protection of the city and its cultural heritage) and their involvement in public decision-making. Indeed, describing the innovation concept, an IBM Manager stressed its social and participatory value: *"For the first time we addressed an important aspect that concerns what we call the 'rate of love' towards our artistic and cultural heritage. The way we feel in front of a work of art can now be measured and used by those who have the responsibility to make decisions for its protection and enhancement. This is very important, since smart cities are made of emotions beyond the technological aspects that support their development"*. At the same time, this app is also the vehicle for an innovation of practices within the public institution for decision-making processes related to cultural and tourism development, since these can be based on bottom-up information reflecting real users' needs. The social nature of innovations in both projects is also reflected at the broader city level, where they pursued to produce an environmental and cultural impact respectively, which in both cases is ultimately aimed at fostering cities' sustainable development. At the network level, the main innovation outcomes are related to the learning opportunities created by collective work and knowledge transfer among the partners. In the CS network, these mainly concern the adoption of the Living Lab methodology that relies on a real-life laboratory with end users acting as 'testers' of specific technologies or their combinations through their daily use at the workplace. For the other case, significant learning opportunities were reported with regard to the structured approach brought by IBM for communications management. As highlighted by Giuseppe Di Guardo, head of Siracusa municipality's Europe Office (Ufficio Programmi Complessi e Politiche Comunitarie): *"This partnership allowed us to learn much about such a valuable approach to managing interactions"*. Moreover, the collaboration with IBM was perceived as an opportunity for pushing an internal change process that was felt necessary for boosting urban innovation.

In the achievement of these outcomes, a number of external and internal drivers appear to be influential for the initiation, development and operation of the examined networks. With regard to those stemming from the broader smart city innovation context, the two cases present some common factors, namely the high importance of the public mission, i.e. the intention to improve the quality and efficiency of city services, accompanied by concrete actions from institutions in the form of innovation supporting initiatives; funding opportunities; institutional/political support to the network. Indeed, in the CS case increased environmental concerns produced strong pressure on public agents to improve the efficiency of city services and reduce the levels of pollution and CO2 emissions through the development and adoption of energy-saving technologies by city users. In this respect, although the initial impulse to the project was given by a private waste collecting company, the decision of ASC to formally launch the project relied on the convincing nature of the proposed concept and the high energy-efficiency potential of the envisaged technologies. ASC's central role as initiator, coordinator and promoter shows the key function of the public actor for signaling the importance of the project and accelerating the network formation. Since the public-private partnership has acted from the beginning without any 'personal and financial interests' to bring interested parties together and foster collaboration,

it has built a solid public trustworthiness, thus providing an important impulse to network building. Public support was also given in the form of funding, with financial resources provided by both the non-profit public organization Amsterdam Economic Board, co-founder of ASC, and the Amsterdam Centrum District Administration. According to Ger Baron, cluster manager of ASC, Amsterdam is one of the few example of urban innovation that has showed to be sustainable through the balanced mix of the private and public actors: *“The Public administration support is essential: produces ‘trust’, open data, long-term commitment, policies and leadership”*. In a similar way, the LCIS project was itself the concrete result of the strong municipality’s commitment and efforts to smart urban innovation and to the definition of a holistic plan for balancing the competing economic imperatives of tourism and industry with its environment, transport, culture and the preservation of its great heritage. This commitment was reflected in the support to the project’s activation, development and promotion from the local public authority. At the same time, an important driver for the PPP’s set up was the support provided by IBM Foundation Italy, which financed the project, contributed to its coordination and made available highly specialized human resources, technological know-how and service solutions. Another significant external driver shared by the two cases was the orientation of institutional actors towards an inclusive approach to urban innovation, balancing top-down and bottom-up initiatives. The CS project perfectly reflects the approach deliberately adopted at higher level by ASC to stimulate collaboration and innovation through the development of smart city projects (Zygiaris, 2013). As reported by Ger Baron (2013), *“ASC does not just believe in a top-down approach; there is a strong belief at ASC that bottom-up ideas can contribute greatly to our city, especially when it comes to the development of new products and services”*. According to the cluster manager, an inclusive bottom-up approach enables end users (i.e. the Amsterdam’s citizens) to collaborate in the development and experimentation of products and services that are mainly directed at them and at the same time it is the most effective strategy for increasing citizens’ awareness to deal with environmental and sustainability challenges of the cities. Also the municipality of Siracusa has put into practice a number of inclusive initiatives to foster the collaboration among local stakeholders and the direct participation of the community in the implementation of the urban development plan. In particular, it organized several technical tables involving a high variety of local stakeholders to discuss key decisions and actions for planning the city’s future and pursued social empowerment, considered as a pillar for city’s development and branding. This result is in line with previous evidence on smart cities, highlighting the importance of an inclusive and participative bottom-up approach for the success of smart strategies (Achaerandio *et al.*, 2012; Komninos *et al.*, 2013; European Parliament, 2014).

With regard to internal drivers (i.e. stemming from the networking regime), the comparative analysis shows some common key factors in the two smartServPPINs. First, the adoption of a joint public-private leadership, which in the CS case was exerted by ASC (strategic leadership) and Club van 30 (operative leadership) and in the LCIS one was played by the Siracusa municipality and IBM Foundation Italy. In this regard, it is important to highlight that in both cases the collective nature of the leadership had its roots in previous collaboration and personal relations among involved parties. In the LCIS case, in particular, the positive regime between the partners also derived by the fact that the project was conceived in close continuity with past collaboration (i.e. Siracusa’s participation to IBM’s Smarter Cities Challenge). Moreover, inter-organisational relationships were characterized by a balance in actors’ influence and power in the network and win-win situations were guaranteed from the outset, when it was clear that collaborative innovation was beneficial for all the partners and the network dynamics was not influenced by opportunistic behavior and interests’ conflicts. In the case of CS, the presence of key innovative individuals provided a further important internal driver for the success of the innovation network. In this respect, the action taken by the shopping street manager was particularly crucial. Indeed, he served as local visionary pioneer and innovation champion for the project and together with ASC and the project manager *“had to work to connect and translate the Climate street concept to entrepreneurs”* convincing them to join the pilot. Actually, this was not an easy process since *“most entrepreneurs did not have the time to think about the environment”* (Sauer, 2012). His role, however, was essential not only in the initial stage of the network formation, but throughout the development process when it was necessary to ensure their involvement: *“the processes must be explained to the entrepreneur in a clear manner. It is important for the entrepreneur to be able to understand clearly what the benefits are for the business....the shopping street manager is the main point of contact and hereby can communicate with one voice to the entrepreneurs about all the developments in the street”* (Amsterdam Smart City, 2011). Indeed, the champion role of the street manager proved to be vital for the set-up of an effective communication system, which was direct, transparent, based on face-to-face information exchange, to promote their strong commitment to the project’s sustainability goals. Finally, the choice to initially involve in the pilot only a small number of more motivated and innovative entrepreneurs revealed itself as an important success factor (European Parliament, 2014), since through their convinced action they served as ‘ambassadors’ of the project, promoting its benefits to other entrepreneurs in the street and locally producing positive spillovers.

In sum, the two smartServPPINs share a number of common factors that are likely to contribute to their success, against a different maturity stage of cities’ *smarticization* and complexity of the innovative solution realized by the selected innovation projects. Table 1 provides an overview of the main common and different factors emerged from the comparative analysis. This, in particular, shows the applicability of the framework in different arenas, networking conditions and various level of complexity of innovation processes and outcomes.

Table 1. Summary of the comparative case analysis.

FRAMEWORK COMPONENTS	EXAMINED PROJECTS AND ASSOCIATED SMARTSERVPPINS	
	Amsterdam Climate Street concept (The Netherlands - 2009)	Love City Index Siracusa App (Italy – 2013)
<i>Structure and process</i>	<ul style="list-style-type: none"> • Broad and diversified network • Small team of private-public initiators • Bottom-up mode of inducement • Member selection based on existing personal relationships & technical know-how/resources • Formal governance structure 	<ul style="list-style-type: none"> • Innovation-oriented PPP • Top-down mode of inducement • Partnership based on previous cooperation & existing relationships • Informal governance structure
	<p>Common features:</p> <ul style="list-style-type: none"> • <i>Key role of big multinational technological players</i> • <i>Network stability (composition & roles)</i> 	
<i>Outcomes</i>	<ul style="list-style-type: none"> • Architectural innovation (technology-based system of service solutions) • Social innovation: environmental awareness & energy consumption behaviour • Learning at network level through the Living lab methodology • Environmental impact at city level 	<ul style="list-style-type: none"> • Social innovation: awareness & responsibility for cultural heritage protection; innovation of decision-making practices through users' engagement & feedback integration • Learning at network level through the sharing of communication management practices • Tourism & cultural heritage development at city level
	<p>Common features:</p> <ul style="list-style-type: none"> • <i>Technological innovation</i> 	
<i>Smart City Innovation context</i>	<ul style="list-style-type: none"> • Advanced stage of smarticization 	<ul style="list-style-type: none"> • Moderate stage of smarticization
	<p>Common drivers:</p> <ul style="list-style-type: none"> • <i>Public mission</i> • <i>Funding opportunities</i> • <i>Technological opportunities</i> • <i>Institutional/political support</i> • <i>Balance of top-down and bottom-up approaches</i> 	
<i>Networking Regime</i>	<ul style="list-style-type: none"> • Presence of an innovation champion • Frontrunners as project ambassadors 	<ul style="list-style-type: none"> • Project born in continuity with previous collaboration
	<p>Common drivers:</p> <ul style="list-style-type: none"> • <i>Joint public-private leadership rooted in previous collaboration/personal relationships</i> • <i>Influence and power balance</i> • <i>Win-win situations</i> 	

6 Conclusions and further research

The purpose of this paper is to provide a contribution to the increasingly relevant issue of innovation within the smart city context by leveraging the interpretive potential of the service innovation perspective, namely the concept of ServPPINs, drawing on the research stream disclosed by Gallouj and colleagues in recent years. These public-private innovation networks in services enrich the traditional concepts of innovation networks and PPPs and are a new means of approaching, from a network-based perspective, a field of innovation that is still largely underexplored, namely innovation in public services (Gallouj *et al.*, 2013a). Thus, it is believed that ServPPINs can provide a useful lens to advance the understanding of networked innovation within the complex and fast-changing landscape of smart cities, by better addressing the complexity of interactions between public, private, third-sector organizations and users/citizens communities in the development of innovative city services. Based on this concept, the paper proposes a conceptual framework for exploring the role of smartServPPINs in realizing opportunities for technological as well as non-

technological innovations in the smart city context and the factors influencing their effective operation. The proposed framework is then applied to the analysis of two European case studies of smart projects and the service innovation networks associated with them. The comparative analysis supports the interpretive capability of the ServPINN concept in the context of smart city innovation, thus providing a conceptual contribution to this emerging field. It is shown how the proposed framework can contribute to disentangling the complexity of these inter-organizational arrangements through its components and how this can apply in different arenas, conditions of networking and various level of complexity of innovation processes and outcomes. With regard to the second objective of the paper, the comparative analysis provides empirical evidence for advancing existing (but still scanty) knowledge about the characteristics of smart innovation networks, their set up and governance, and the relative importance of different drivers for the successful development of innovations for the smart transformation of cities. In particular, the comparison between two quite different cases allowed us to identify some common key factors for smartServPPINs success, notwithstanding their inherent differences with regard to the smart city innovation context and the level of complexity of the innovative solutions realized within the two projects. These common factors should be taken into account for the effective set up, management and diffusion of networked innovation models for the smart transformation of cities. From an operational point of view, this implies the need to develop an understanding of the role and the functioning of smartServPPINs and, based on this, to create/ensure the proper conditions that are functional to the activation and maintenance of both the external and internal key drivers of collaborative innovation, coherently with the specific smart city situation. In this direction, public actors have a key role and responsibility, since they are in the position to exert concrete actions at different levels to influence the effectiveness of collaborative innovation in the smart city context. Further research will be oriented to overcome the limits of the present study, by extending the number of cases to further validate and strengthen the applicability of the proposed framework. In this regard, it could be useful to perform cross-case analysis of different smartServPPINs within the same city as well as of similar networks in terms of goals and innovation types in different cities. Another future research direction to improve the contribution of the proposed framework is represented by a deeper analysis of network dynamics, which does not form the focus of the present paper, although it is essential to better explain the role and success as well as the potential barriers of smartServPPINs in realising innovations.

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Citizen Generated Social Innovation Creating Institutional Change: Case Study of Restaurant Day

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This paper discusses social innovation as a phenomenon generated by citizens for citizens that is rooted in the growing citizen activity in innovation, concentrating on how it creates institutional change. The empirical data for the study was collected through semi-structured interviews and observation focusing on one case of citizen generated social innovation, Restaurant Day, a phenomenon initiated in Finland as a result of citizen activism. The findings of this paper indicate that institutional change can be created by a social innovation as a result of interplay between action and mental change when successful framing, illusion of legitimacy and ability to mobilize citizens initiate collective action.

1 Introduction

Innovation has become increasingly distributed across a variety of stakeholders (Bogers; West, 2012), an activity that includes users (von Hippel, 2005) and can be initiated from the grassroots level (Seyfang; Smith, 2007) as a citizen initiative. Social aspects of innovation (Hargadon, 2003, ix; Hellström, 2004) have received attention in scientific research as participation and collaboration have been acknowledged to have an important role in many parts of innovation process (Hellström, 2004). Social interactions are also a crucial component in social innovation; 'social' does not solely refer to the outcome of the innovation but also the actions and involvement of people in the process of creating the innovation (Moulaert, 2013, 2).

Social innovations answer a social need or bring social benefits to communities (Moulaert, 2013, 1). Besides a goal that supports enhancing social well-being, the means to reach that goal are social (Dawson; Daniel, 2010), with the realization of the innovation consisting of social interactions (Hellström, 2004). The social goal does not have to focus on solving global issues, but can involve smaller-scale community enhancement. Scientific research on social innovation is not well established yet (Chalmers, 2013; Maclean; Harvey; Gordon, 2013; Neumeier, 2012), but social innovation has raised increasing academic (Maclean et al., 2013) and societal (OKFN LOCAL: Finland, 2013) interest.

In this paper I explore social innovation as a phenomenon generated as a community effort, a grassroots phenomenon generated by ordinary citizens rather than a company. The focus is on how such social innovation can create institutional change, concentrating on the mechanisms initiating and establishing change and creating legitimacy around the social innovation. Social innovations often initiate change given that they are created to make a difference, solve a social issue (Moulaert, 2013, 16) or improve well-being (Dawson; Daniel, 2010). This creates a fruitful basis to consider institutional change as essentially related to social innovation. As social innovations tend to change practices, they prompt changes in different institutionalized systems. Studying social innovation and its ability to create change can help in understanding how they could be used more efficiently as vehicles of change. Collective action (Seo; Creed, 2002) has been crucial in creating change in the case of Restaurant Day. This resulted from the successful framing of the cause and the ability to mobilize citizens when facing a contradiction (Seo; Creed, 2002). Further study of the topic can clarify how ordinary citizens can be mobilized to support a social purpose.

Social innovation and institutional change have been connected previously (Cajaiba-Santana, 2014; Hämäläinen; Heiskala, 2007), but the approach in this paper is different. Previous research has examined the effects of institutions and institutional change on social innovation whereas my perspective is based on how social innovation can create institutional change.

This paper covers one specific case of social innovation, Restaurant Day, initiated as an attempt to make it easier for ordinary people to start their own restaurant in the face of complicated Finnish regulations. Restaurant Day was initiated in 2011 by a few active citizens who wanted to rebel against the regulations and at the same time create a food-based festival to bring people together. As the event has grown more popular, the focus has shifted away from rebelling and towards an empowering event that gives people an opportunity to express themselves. Restaurant Day has become an international phenomenon, raising interest abroad. It has been arranged in 56 countries, involving an estimated 38,500 restaurateurs and 1,060,000 customers during its existence of three years (Restaurant Day Homepage, Info). Through engaging a large number of citizens in contributing and visiting, Restaurant Day has initiated a mental change and prompted changes in the institutional order and citizens' attitudes.

The findings of this paper imply that social innovation can initiate change through social innovation that acts as contradiction. If active citizens succeed in mobilizing collective action, the changes can spread to cover a wider audience, eventually having an effect at institutional level.

This introduction is followed by the theoretical background regarding social innovation and institutional change. After the theoretical background, the empirical basis of this paper is introduced covering the case description of Restaurant Day and the methods that were used for data collection and analysis. Then the empirical findings of this

paper are introduced and discussed in the light of existing research. Finally, concluding remarks summarize the main findings and implications of this paper.

2 Social Innovation and Institutional Change

Social innovation has not yet reached a normative state as a scholarly field and the dominant logic of social innovation is still being shaped (Chalmers, 2013). This can be seen in the variety of situations and approaches in which social innovation is referred to in scientific literature. Scientific literature on social innovation is scattered not only throughout different fields of research, it is also dispersed in the approach of defining social innovation varyingly as an effort, method, result or collaboratively initiated change (Neumeier, 2012). Inspired by Neumeier's (2012) division I have collected in Table 1 a variety of social innovation definitions to provide an overview of the variance of the definitions. Table 1 does not fully follow Neumeier's (2012) division; it is merely inspired by it, and is also based on my own findings from studies of social innovation and my interpretation of the definitions.

Table 1. Categorization of different definitions of social innovation.

Approach	Author	Definition
RESULT	Mulgan; Tucker; Ali; Sanders, 2007, 9	"Social innovation refers to new ideas that work in meeting social goals."
	Pol; Ville, 2009, 881	"an innovation is termed a <i>social innovation</i> if the implied new idea has the potential to improve either the quality or the quantity of life"
EFFORT	Mumford, 2002, 253	"The term social innovation, as used here, refers to the generation and implementation of new ideas about how people should organize interpersonal activities or social interactions, to meet one or more common goals."
	Dawson; Daniel, 2010, 10	"For us, social innovation can be broadly described as the development of new concepts, strategies and tools that support groups in achieving the objective of improved well-being"
CHANGE PROCESS	Neumeier, 2012, 55	"--we define social innovations as changes of attitudes, behaviour or perceptions of a group of people joined in a network of aligned interests that in relation to the group's horizon of experiences lead to new and improved ways of collaborative action within the group and beyond"
ALL-EMCOMPASSING	Cajaiba-Santana, 2014, 44	"--social innovations are new social practices created from collective, intentional, and goal-oriented actions aimed at prompting social change through the reconfiguration of how social goals are accomplished"

In this paper social innovation is defined as an innovation that answers a social need or brings social benefits to communities (Moulaert, 2013, 1) combined with social means to achieve these goals (Dawson; Daniel 2010). The need that is met by the social innovation can be any kind of social need ranging from a severe social problem to opportunities to improve the well-being of a community, and it can be a product, service, activity or change in institutional structures that brings improvement to how things have traditionally been done (Moulaert, 2013, 1).

The emergence and diffusion of social innovation are crucial knowledge when examining social innovation. The emergence of Restaurant Day originates from the effort of ordinary citizens setting up an event with a social goal and social means to achieve it (Dawson; Daniel, 2010). In the case of Restaurant Day the emergence and diffusion have so far created institutional change on a small scale, changing practices and ways of doing things in regions where it has gained a strong support. Social innovation functions as the starting point for the change – the social issue causing contradiction (Seo; Creed, 2002) is framed (McAdam; McCarthy; Zald, 1996 cited in Hargrave; Van de Ven, 2006) in the form of a social innovation. After the initial contradiction the change gains foothold through individual actors and the collective action they succeed in mobilizing.

Diffusion of social innovation is linked to the emergence of institutional change, as change starts emerging when the innovation gains support. Diffusion is identified as the last stage of institutional change process preceding re-institutionalisation (Greenwood; Suddaby; Hinings, 2002). There is also a link to the other direction; institutional change can open opportunities for social innovations. Institutional change in this paper refers to a process where institutions change; it can be both organizational operation models (Scott 1995, p. xiii), or citizens' shared beliefs and assumptions (Scott 2007, p. ix) that change.

Institutional change is usually initiated by a contradiction (Seo; Creed, 2002) or a jolt (Meyer; Brooks; Goes, 1990) that starts the change process, embodied for example in an idea of a social innovation. Change agents, for example social innovators, decide to challenge the prevailing system and mobilize collective action to their support (Seo; Creed,

2002). Contradiction can occur not only between opposing parties but also between people of the same constituent group (Swan; Bresnen; Robertson; Newell; Dopson, 2010).

Social movement scholars identify mobilizing structures and framing processes in explaining how change is achieved (McAdam et al., 1996 cited in Hargrave; Van de Ven, 2006). Mobilizing structures refer to the networks of actors and other resources that are available to be mobilized and engaged in collective action. Framing processes refer to the processes that social movement actors use in formulating the cause they are promoting. (McAdam et al., 1996, cited in Hargrave; Van de Ven, 2006)

Mobilizing resources and collective action as part of these resources is crucial in pushing through innovations to create change (Rao; Giorgi, 2006). Rao and Giorgi (2006) point out especially the importance of “social networks, formal and informal organizations, and conduits of contagion” based on their study of different extreme institutional change cases. Building a network of friends and potential allies or elite allies support mobilization (Rao; Giorgi, 2006). Hargrave and Van de Ven (2006) also acknowledge the construction of networks in mobilizing collective action. Dorado (2005) identifies leveraging as a means to mobilize resources. Leveraging consists of first defining a project, then gaining support for this project from supporting actors or backers, and then together with the backers trying to gain the support of external constituencies (DiMaggio, 1988 cited in Dorado, 2005). In leveraging the role of the actor who drives the project forward is important (Dorado, 2005). Skilful framing allows the actor to set the context and gives the actor power (Rao, 1998), and convincing others that there is a need for change and that the actor’s approach is the right one gives the actors the possibility to define and solve the problem in their own way (Fligstein, 1996).

Seo and Creed (2002) also identify collective action as an important part of the institutional change process emphasizing framing and mobilizing actions in their work. In the creation of new social structures the agents need to firstly develop alternative models of social arrangement (e.g. schemas, scripts, logics of action) and secondly to mobilize resources for political action to challenge the existing structures. These two, creating alternative frames and mobilizing resources, intertwine as the agents need to justify their attempt with the alternative models, and only if they succeed in creating credible schemas and scripts can they mobilize resources to political action. Seo and Creed (2002) argue that not all frames have equal potential to mobilize change efforts.

Activists frame the purpose and limits of the change movement. Successful framing (Seo; Creed, 2002) and utilizing social networks (Hargrave; Van de Ven, 2006; Rao; Giorgi, 2006) can also help in mobilizing resources through leveraging (Dorado, 2005) leading to collective action. Collective action precedes institutional change; when a critical mass (Neumeier, 2012) joins in pushing forward a change, changes are likely to occur at least to some extent. In this process legitimation is also important; collective action can be seen to legitimate a movement as legitimation occurs when people adopt ideas that exemplary others have first adopted (Mizruchi; Fein, 1999) through mimicry (Neumeier, 2012). Legitimation in itself also creates institutional change as a phenomenon becomes commonly accepted and legitimate (Suchman, 1995).

The actors who drive the change and mobilize resources are themselves also important in the change process and its legitimation. Den Hond and de Bakker’s (2007) reformative activist groups and radical activist groups have different approach to legitimizing their actions. In deinstitutionalization reformative activists justify their actions based on what they *do* using consequential arguments; radical activists justify their actions based on both what they *do* and what they *are* using both consequential and structural arguments accordingly. In re-institutionalization radical activist groups argue their cause with moral legitimacy, whereas reformative activist groups appeal to both moral and pragmatic reasoning. Another big difference between reformative and radical activist groups is whether they concentrate on de-institutionalization or re-institutionalization. Radicals put more time and effort in deinstitutionalization, and reformists put more time and effort in re-institutionalization.

Hensmans (2003) presents two archetypes of challengers similar to those of den Hond and de Bakker (2007). His modern reformers are similar to den Hond and de Bakker’s (2007) reformative activist groups, and his revolutionaries are like the radical activist groups of den Hond and de Bakker (2007). Revolutionaries are disruptive challengers; modern reformers are moderate challengers. Both position themselves in terms of justice, but revolutionaries are more antagonizing towards incumbents. (Hensmans, 2003) Hensmans (2003) also presents two archetypes of incumbents – resisters and classic reformers. Resisters resist challengers’ attempts for change, whereas classic reformers are renewing incumbents who are more open for change (Hensmans, 2003).

Rao and Giorgi (2006) talk about institutional entrepreneurs and suggest that they can be insiders or outsiders to a certain social system and that they can exploit the pre-existing logic within that social system or optionally import a new logic to that system from a different domain. Rao and Giorgi’s (2006) argument is that instead of explaining institutional change by external shocks it can be explained by people from within or outside the institution employing new or existing cultural logics in pushing forward their own institutional projects. (Rao; Giorgi, 2006) Institutional change can thus be initiated and led by agents who want to change the existing system.

Challengers can also collaborate with the incumbents. Independent activists and field incumbents can start working collaboratively and this collaboration changes the field in question (Van Wijk; Stam; Elfring; Zietsma; Den Hond, 2013). In order for the collaboration to work between the challenger movements and field incumbents there must be intensive interaction and communication between the parties, and recognition that they both are involved in an institutional change project. They also need to “develop shared norms, beliefs and frames of reference” to facilitate their interactions. A movement that is moderately structured can produce threats and market opportunities that the field incumbents will notice, at the same time being permeable to the incumbents’ influence. (van Wijk et al., 2013) Also

Castel and Friedberg (2010) agree that for a reform to succeed it owes as much to the incumbents and to challengers as it is a product of their interaction.

Rao, Monin and Durand (2003) identify two different movements with different motivations in creating institutional change: instrumental movements and identity movements. Instrumental movements aim at correcting injustices and challenging existing political and economic structures, and striving to change laws and governance structures. Identity movements on the other hand consist of actors who categorize themselves as group members and identify with this group. In identity movements the focus is on the defects that occur on the proximal level of identities of the existing institution. (Rao et al., 2003)

The loop of institutional change goes on forever; in the dialectical perspective to change no institution is seen to be permanent as new contradictions will always arise to challenge the existing systems (Seo; Creed, 2002; Hargrave; Van de Ven, 2006).

3 Context and Methodology

This section covers the empirical background of this paper. First, the phenomenon studied in this paper, Restaurant Day, is introduced. Second, the approach of this paper together with the data collection and analysis methods are presented.

3.1 Case Description of Restaurant Day

Restaurant Day is a one-day event that takes place every three months (Restaurant Day Homepage, Info) where anyone can set up their own restaurant, café or street food stand for one day. It was founded in Finland and took place for the first time in May 2011 (Restaurant Day Homepage). It has become very popular during the three years it has existed so far; Restaurant Day has been arranged in 56 countries, involving an estimated 38,500 restaurateurs and 1,060,000 customers during its existence of three years (Restaurant Day Homepage, Info).

Restaurant Day was originally initiated by a few active citizens, who wanted on one hand to rebel against regulations regarding selling and serving food that they found too strict and complicated (Aamulehti, 2014) and on the other hand to create a festival that brings people together around food (Nurmijärven Uutiset, 2012). As the event has grown more popular the focus has shifted further from rebelling and more towards supporting the well-being of the community and spicing up urban environment.

Restaurant Day functions as a joint effort of all the people taking part in it. It is an open event that anyone can take part in as a restaurateur or as a customer. It is based on voluntary citizens setting up restaurants and customers eating in these restaurants. (Maaseudun Tulevaisuus, 2014) The event itself is free; it costs nothing to register as a restaurateur. Restaurant Day is facilitated by a registered association Ravintolapäivä ry. It is a non-profit organization that runs on sponsorships and the money from different prizes. The people involved in the Restaurant Day organization are not paid but work for the event on a voluntary basis.

3.2 Data Collection and Analysis

This study was conducted as a case study (Laine; Bamberg; Jokinen, 2007, 9). The empirical data regarding the case of this paper, Restaurant Day, was collected by conducting observation and semi-structured interviews. Observation was conducted twice to gain access to possible interviewees and to observe the event in general. Majority of the data was collected through semi-structured interviews with Restaurant Day restaurateurs and with founders of the event.

The analysis of the data was done as thematic analysis, both with the observation data by coding and memoing (Emerson; Fretz; Shaw, 1995, 142-168) and with the interview data as a combination of data-driven coding and concept-driven coding (Gibbs, 2007, 44-46). Originally the analysis concentrated on finding themes related to the emergence of a citizen generated social innovation. During the analysis, however, other themes emerged that concentrated on the changes caused by the diffusion of the phenomenon. Also themes relating to how Restaurant Day has become legitimate emerged from the data. This led to concentrating on the changes social innovation can create and how as the focus of the paper.

4 Findings

This section concentrates on introducing the findings on how a citizen generated social innovation creates institutional change. In the case of Restaurant Day it has been the emergence and diffusion of the innovation that has created institutional change, and this change has occurred on two levels. First, there have been changes in citizens' perceptions on what can be acceptable behaviour that has initiated a feeling of empowerment in regards to their surroundings and what can be done there. Second, Restaurant Day has created institutional change in the structures and attitudes of cities where it has been strongly established, for example the City of Helsinki and the Finnish Government were mentioned in the interviews. Changes in citizens' shared beliefs and assumptions (Scott, 2007, ix) and changes in organizational operation models (Scott, 1995, xiii) have also been identified by Scott (2007, ix; 1995, xiii) as features of an institutional change process. The main changes that came up in the interviews were changes in citizens' attitudes; changes in urban culture as people use their urban environment more and in more creative ways; changes in food culture in the form of food events, street food, and ethnic food; and changes in permissions as Restaurant Day is for

example encouraged by the City of Helsinki, and has been approved by the Finnish Food Safety Authority Evira. In the words of one interviewee, restaurateur 7:

– – be a part of some kind of change that it has turned out to be, that things have changed after Restaurant Day was initiated. And now that you can see it, for example in Helsinki festival, that Restaurant Day has made a difference in the development – – it wasn't just fooling around and some kind of crazy one-off restaurant thing; in the long run it has actually led to development of street food, a new atmosphere in the street scene and a new attitude of the authorities towards legislation and other things. And that people in Helsinki and elsewhere in the world, they have understood and learned to utilize the city independently in a new way – –

In initiating Restaurant Day there was an issue the founders wanted to solve that caused contradiction, and they decided to act to show that the regulation causing the contradiction does not make sense thus challenging the current institutional order. This issue can be seen as a jolt (Meyer et al., 1990) or a contradiction (Seo; Creed, 2002) that causes institutional structures to start deinstitutionalizing (Greenwood et al., 2002) thus acting as the source of institutional change. In addition to the issue, there were people who wanted to challenge the prevailing way of doing things becoming the active agents in furthering institutional change.

An important part of actually achieving institutional change were the good mobilizing structures (McAdam et al., 1996 cited in Hargrave; Van de Ven, 2006); it came up in the interviews that the founders have wide networks of friends and acquaintances whose importance in mobilizing collective action is also recognized by Rao and Giorgi (2006) and Hargrave and Van de Ven (2006). In the beginning the founders were able to spread knowledge of Restaurant Day through these extensive networks. In addition, more networks could be built by spreading the word through the networks of the founders' networks in social media. The founders applied leveraging to mobilize resources (Dorado, 2005) as they first got a small number of people to join them in backing their cause, and from there on the movement spread to cover a wide audience and to affect institutions. As part of mobilizing collective action Restaurant Day also succeeded in framing (McAdam et al., 1996 cited in Hargrave; Van de Ven, 2006) their cause in a simple and appealing way which enabled collective action (Seo; Creed, 2002). They succeeded in framing their cause legitimate despite its possible illegality as their story was easy and compelling for media to talk about.

In the case of Restaurant Day the significance of networks in spreading knowledge became obvious throughout the interviews also with the Restaurant Day restaurateurs; all the interviewees had first heard of Restaurant Day through their friends, colleagues or school mates. So after the founders had started spreading word about Restaurant Day, the knowledge later continued spreading through the networks of people who knew about Restaurant Day, citizens who had participated in Restaurant Day and also through media.

In the spreading and diffusion of Restaurant Day preceding wider adoption many of the interviewees talked about general visibility and how the phenomenon became a hot topic in traditional media. It was mentioned how many of the interviewees had observed Restaurant Day in different media and how media got excited about Restaurant Day. One of the interviewees discussed how media visibility probably got the mass to participate in Restaurant Day. An interesting aspect of the media attention was that the different media were the proactive ones to approach Restaurant Day starting to tell the story of Restaurant Day and individual Restaurant Day restaurateurs to wider audiences. This kind of spreading of the knowledge of Restaurant Day through various networks and in legitimate channels was important in the diffusion and adoption of Restaurant Day. The event raised interest among citizens, and the knowledge of the event and participation rate expanded quickly resulting in collective action.

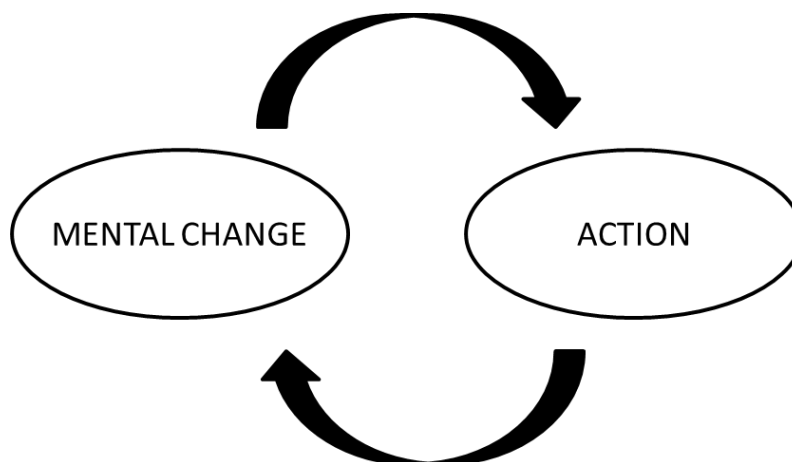


Figure 1. Change in attitudes leading to action, which again re-enforces changes in attitudes.

An important step in actually making a change in people's attitudes is how Restaurant Day succeeded in becoming legitimized. This happened as a result of the interplay between action and mental change (Figure 1), with the aid of visibility in social and traditional media. Media played a big role in spreading word about Restaurant Day to wider audiences as they made stories of Restaurant Day in TV and in different papers: "On Restaurant Day - - all the big main

news agencies - - went strolling around and did a story, and during that summer you could say that a snowball effect got started, people started looking forward to the next Restaurant Day“ (Founder 1).

This kind of spreading of the knowledge of Restaurant Day through various networks and in legitimate channels was in itself creating legitimacy and advancing the diffusion of Restaurant Day. The diffusion on its part also increased the legitimation of Restaurant Day as more people participated in Restaurant Day. The legitimacy can thus be seen to originate also from mimicry which Neumeier (2012) identifies in the context of social innovation adoption and acceptance.

Citizens accepted and adopted Restaurant Day which initiated a mental change, as has been acknowledged by founder 2: “I myself consider the change in attitudes, the mental click in people’s heads, realizing like wow these kinds of things can be done – - is the coolest thing we have accomplished.” Especially in the early days of Restaurant Day it was unclear to people whether this kind of action was acceptable and legal. Some people were worried about needing permissions for doing something like this, like restaurateur 6 mentioned: “Many people ask, even if they know about Restaurant Day, that where do you make a notification about this. Nowhere, just do it.” So the hop from being sympathetic towards Restaurant Day to actually becoming one of the contributors required a change in how this kind of citizen activism was regarded, perceived and accepted.

There has been a long period of time when the city and the urban space has been considered as something outside of us, people have regarded that there is an official institution called the city, and the city does everything that happens in the city and gives permissions to everything that happens in the city – - it has been a challenge to get people to believe that there is no barrier to sell buns out there, there are no laws or regulations that prohibit it directly – - it is still one of the biggest challenges when Restaurant Day expand to new places. (Founder 1)

The original philosophy of Restaurant Day was not to care about whether permissions are needed or not, and just setting up pop-up restaurants without asking permissions like founder 2 expressed it: “We didn’t ask anyone if this was a problem, we didn’t really give a chance for problems.” The example the first participants set showed other citizens too that no problems followed from doing this without permissions. The second time Restaurant Day took place the participation increased a lot: “- - maybe not during the first time but already the second time Restaurant Day had grown so big that there was no chance to stop it anymore” (Founder 2). This kind of cycle of attitudes changing and leading to citizens activating and participating (Figure) gave Restaurant Day a critical mass of supporters (Neumeier, 2012), so the phenomenon could no longer be stopped.

Once you reach the critical mass and there are enough people thinking this is a good idea, and especially when it comes to Restaurant Day people are quite passionately thinking this is a good idea, there is such an asset that we can inevitably go through all problems. (Founder 2)

The institutional change created by Restaurant Day started from affecting the attitudes and behaviour of individual citizens. After this structural and attitude changes in strong Finnish institutes like the state and the city of Helsinki have also occurred.

I think you can see the change very concretely in Helsinki at least. Firstly during the past three years the atmosphere in here has become much more empowered, we can act, we can take over the urban spaces, this city belongs to us, overall we can try out different communal things – - It is not owing to Restaurant Day, but Restaurant Day has been strongly involved in creating such atmosphere and ambiance that things are possible and that we can do things together and that there are alternative ways. And like urban culture and urban culture events have started thriving after it. (Founder 2)

Founder 2 talked in the interview about how “legislation and instructions concretely, and how the city as an organization or different bureaus respond to this activism, it has changed a lot”. The attitude of the City of Helsinki has been very positive although Restaurant Day was initiated as something that broke some of its rules: “If the mayor talks how the city as an organization should learn how to involve people and including them in participatory development from Restaurant Day, it sure has given more weight to citizen democracy and such. It sends a really strong message.” (Founder 2) Other official parties like Finnish Food Safety Authority Evira have given statements about how Restaurant Day is acceptable and this kind of event can run without it being a problem regarding e.g. hygiene regulations which was mentioned by both founder members interviewed for this study. This indicates that structural enabling from official side has occurred which allows easier execution and expansion of Restaurant Day and other similar phenomena using the urban space for the purposes of citizens.

5 Discussion

Restaurant Day as a citizen generated social innovation has created institutional change through collective action that was initiated by contradiction. Contradiction is identified as the source of institutional change in research that approaches institutional change from a dialectical perspective (Seo; Creed, 2002). The starting point that caused Restaurant Day to initiate the process of institutional change is rooted in contradiction – the founders felt that the

regulations set by the Finnish Government regarding setting up a restaurant were too complicated. The founders thus acted as 'change agents' as the then existing institutional logic did not suit them (Seo; Creed, 2002). Swan et al. (2010) have stated that it is possible for the contradiction that initiates institutional change to occur also between people in the same constituent group, not only between opposing groups, but in the case of Restaurant Day the contradiction occurred between citizens and an institution.

Citizen generated social innovation can be seen as a statement of contradiction in itself, too, as it is a vehicle of solving a social issue. In addition to the founders initiating this social innovation as an act resulting from a contradiction, also the act itself can be seen as a contradiction because it is a social movement contradicting the prevailing system.

Restaurant Day is citizen generated and relatively open, and it is under constant evolution. A dialectical change process is a cyclical process where the new thesis eventually becomes the antithesis (Hargrave; Van de Ven, 2006), so institutional change never seems to be fully complete. Lately, as the event has established a relatively stable position, the on-going evolution is starting a new cycle of institutional change, this time changing Restaurant Day itself. The original goal and purpose that have driven the change in the beginning can turn into different purposes as the change diffuses and gains support. Therefore, in addition to the change that a social innovation creates in the surrounding mental and structural institutions, the innovation itself can change on an institutional level. So when the founders originally strived to make a change they were able to have a little bit differing goals, some being more interested in developing the food culture in Helsinki and some being more interested in developing urban culture and urban spaces, as the general change enabled all those goals. Now that the event has become established, the more specific wishes are raising their heads and the future directions of Restaurant Day are under institutional change.

Agency and the role of the challengers is another central feature to look at when discussing how institutional change happens. The contradiction that set the institutional change in motion was noticed by the Restaurant Day founders who I previously referred to as 'change agents'. The founders of Restaurant Day can be seen more as reformative activists than as radical activists (den Hond; de Bakker, 2007) – although they were ready to break rules and disregard the existing system, they justified their actions based on the institution's ways of working instead of its mere existence, and found legitimacy in both moral and pragmatic reasoning (de Hond; de Bakker, 2007) as they argued that setting up a restaurant should not be made so complicated for the citizens.

The founders of Restaurant Day were not insiders (Rao; Giorgi, 2006) in regards to the structural institution that it changed, but they can be seen as insiders (Rao; Giorgi, 2006) to the less structural changes, citizens' perceptions of what is allowed in an urban environment. They were themselves citizens who were not sure what is permitted and what is not on behalf of e.g. Finnish Government when selling food in public, so in that sense they represented all ordinary citizens, except that they took action and started setting up pop-up restaurants despite not knowing whether it was allowed. As one significant institutional change here is the attitude change in citizens, the founders can be seen to have initiated the change from within the institution (Rao; Giorgi, 2006).

In regards to the more structural institutional change that Restaurant Day initiated in at least the City of Helsinki and Finnish Government, there has not occurred collaboration between the challengers and incumbents per se as has been observed to happen in some cases during institutional change (van Wijk et al., 2013) but the incumbents have not resisted the change either. These institutions could thus be defined as classic reformers according to Hensmans's (2003) study. The interaction that a successful institutional change requires between the challenger and incumbents (Castel; Friedberg, 2010) exists in a way that for example Helsinki allows Restaurant Day to take place and even utilizes it in its own marketing actions, but no reciprocal collaboration has been established between these two parties, although Restaurant Day has tried to initiate collaboration.

It is pointed out by Seo and Creed (2002) that creating alternative frames is a requisite to mobilizing collective action. In the case of Restaurant Day this seems to have happened in a bit of a cumulative way, starting with the initial framing that led to small-scale mobilization, and then this mobilization and the example these people showed led to a more massive mobilization. Political opportunity structures (McAdam et al., 1996 cited in Hargrave; Van de Ven, 2006) eventually turned out to be favourable to Restaurant Day. The founders took roles of outlaws, only to end up noticing that the prevailing institutions, both the mental institutions of acceptable behaviour in the minds of the citizens as well as the more structural institutions setting official rules, accepted and welcomed the change without much opposition.

The dialectical approach to collective action by Hargrave and Van de Ven (2006) that identifies conflict, power and politics as important building blocks of the change process can be found in the creation and diffusion of Restaurant Day too. A conflict started the change process. It is hard to say whether the founders had much power as such; it seems like the power they had came from the idea and their skills in selling that idea to other people resulting in a small movement that was the source of power. They chose their approach in how to engage in the conflict, just going ahead and doing what they wanted to do without asking for permission, and importantly engaging other people from the very beginning thus gaining more force.

Restaurant Day started out as resembling an instrumental movement but it has evolved more to the direction of an identity movement (Rao et al., 2003). In the beginning there was a clear inclination to making a difference and fixing an injustice and striving for policy changes as is suggested to be typical of an instrumental movement (Rao et al., 2003). As the larger masses joined in arranging Restaurant Day the movement has shifted more towards an identity movement that focuses on the defects in the institution related to identities (Rao et al., 2003). However, there did not seem to be much interaction between separate contributors of Restaurant Day. Interactions took place on micro level, participants

interacting within the little hub their own restaurant created consisting of their own social group, their customers and their existing friends. No interactions seemed to exist between different restaurants. So there seems to be features of both movement types which is perhaps partly explained by the evolution Restaurant Day has gone through, going from a bit of a rebellious act to a national favourite, and partly by the fact that a very heterogeneous collection of people with very heterogeneous incentives contribute to Restaurant Day.

It is difficult to say for sure whether the institutional change in institutional structures in Finland and Helsinki are exclusively due to the fact that so many people were supportive of Restaurant Day, or if the institutions themselves found this action supportable. Perhaps it is a mixture of both, or again an interplay where gradual change in the attitudes of the institutions occurred as more people joined to support Restaurant Day.

6 Conclusions

The findings of this paper help understanding the mechanisms that create institutional change as a result of a social innovation. Social innovations occur in contradicting situations when new social solutions are created to solve social problems. Institutional change is created as the social innovation spreads through networks and becomes visible by earning attention in legitimate media, resulting in people slowly changing their attitudes. As more people take action due to this change in attitudes, the cycle of changing attitudes that lead to action spreads creating collective action and legitimacy around the citizen generated social innovation.

The empirical findings on institutional changes and mechanisms leading to it covered in this paper concentrate mainly on changes in Helsinki where Restaurant Day was initiated and where it has established itself most strongly. I believe concentrating on citizens in Helsinki provides an understanding of a citizen generated social innovation in a context where it thrives, and provides a rather ideal situation for studying how social innovation can create institutional change. The findings of this study are limited to one specific case, Restaurant Day, and might therefore not be applicable to all citizen generated social innovations.

The number of interviews and the amount of observation conducted for this paper are limited due to the restricted time and resources that could be used for this paper. The data gives a good general picture of the phenomenon at hand, but more data could strengthen the reliability of the findings.

In future it would be interesting to widen this study to cover several similar cases of citizen generated social innovation to see how well the findings of this study apply to the phenomenon in general. Also an evolutionary perspective would be worth studying, examining the lifecycles of citizen generated social innovations, how they evolve over time and how different stages of the innovation create change. Extending the data to cover more evidence on the realized changes Restaurant Day and similar social innovations have caused in institutions would be a very interesting extension of this study. Additional data to study the changes could be interviews with city officials, or a study of the changes in different regulations since Restaurant Day – or other citizen generated social innovation events – was initiated. Concentrating on the citizen-to-citizen phenomenon could also give interesting insights into how this kind of activity could be utilized more in the society.

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The environmental impact of economic activity on the planet: the role of service activities

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Climate change is considered one of the most complex challenges of this century, from which no country is immune, nor can, by itself, address the interconnected challenges, nor the impressive technological change needed. We have reviewed proposals and lines of action that are being suggested by international organizations to combat climate change and promote sustainable development, as well as the mechanisms that have been put in place to help with this task.

All econometric estimates in the panel data indicate that indeed the said index not only contributes to increased mortality, but also to increased investment in R & D. In addition, higher fixed effects are located in developed countries, including Russia and China, in the first case, and Brazil in the second. The periods that the model detects as having the greatest time effects range from 1989-2010 in the first case and from 1996 to 2011 in the second.

1 Introduction and objectives

The 2010 World Bank report on Development and Climate Change indicates that the projected temperature increase during the next 100 years due to the growth in emissions of greenhouse gases could represent a global warming of 5° C with respect to the pre-industrial period. According to the report, such a warming has never before been registered in humanity and the resulting physical effects will severely limit development. If ambitious reduction efforts are carried out, such heating would reach 2° C, a level that is already considered dangerous.

Climate change is considered one of the most complex challenges of this century, from which no country is immune, nor can, by itself, address the interconnected challenges, nor the impressive technological change needed. Also, international agencies make it clear that it is developing countries that will bear the brunt— countries which must simultaneously cope with efforts to overcome poverty and promote economic growth. Therefore, a high degree of creativity and cooperation, a "climate-smart approach", is needed.

This is not new. In 1995 the Intergovernmental Panel on Climate Change (IPCC) warned that climate change would involve hazards to human health, as this could double or triple the number of deaths due to heat, disrupt food supplies, displace millions of people, and the extension of hotter tropical climates could bring malaria, encephalitis, and other diseases. It could also cause other infectious diseases due to flooding of sewer and coastal sanitation systems.

However, the results still do not seem to be very promising. Thus, from the study group Platform 2015, we see that with one year left in the period marked by the international community to accomplish the reduction of poverty, not only have the goals not been reached, but instead inequality has soared in most countries. Therefore, the Millennium Development Goals (MDGs) will not meet this goal, but indeed is each day also further from the solutions to climate change and environmental degradation. An example of this is that the Kyoto Protocol has still not been signed by some of those governments most responsible for harmful emissions, more than twenty years after its appearance. In this context, many people are waiting to see what the scope of the new post-2015 development agenda will be.

In this task, in addition to the important and controversial political decisions to be taken, companies will play a leading role. Their investment decisions, their systems of responsible and sustainable management, the varying degrees of collaboration with governments and international agencies— all of these issues, which are strategic decisions, in addition to their market positioning, will contribute greatly to whether the planet is sustainable or not. Our main objective is to estimate the impact of economic activity on environment by means of the calculation of an environmental impact index. Then some specific objectives will be developed. First we will study the association between environmental impact and mortality, as a variable representative of the health effects. Secondly, we will analyse the relationship between environmental impact and R&D investments. Finally, we will explore and estimate the possibilities of a specific service sector contribution in the fighting against climate change.

2 Methods and expected results

We have performed a literature review to try to analyse corporate behaviour in the present time of economic crisis with regard to sustainable and responsible management. We will try to discover the solutions that are being contemplated in economic and environmental science. We have also reviewed proposals and lines of action that are being suggested by international organisations to combat climate change and promote sustainable development, as well as the mechanisms that have been put in place to help with this task.

Then, a first estimate was made to test what is really happening in the world with regard to the economic and social impact that climate change is causing. One way to measure the environmental impact that our economic activity has on

the planet was discovered in the 1970s by biologist Paul Ehrlich and physicist John Holdren. This method utilises an index based on total population, wealth per capita, and environmental degradation.

The theoretical base of this index is founded on the analysis of what they call primary causes of environmental problems, which according to environmental experts are the following:

- Rapid population growth.
- Quick and wasteful consumption of resources.
- Simplification and degradation of parts of the life support systems of the earth.
- Poverty, which can lead to unsustainable use of non-renewable resources.
- Failure of the economic and political systems in promoting sustainable development.
- The drive to dominate and manage nature for our own uses without a thorough knowledge of its functioning

A way to connect environmental problems and their root causes, according to the aforementioned authors, would be through the above scheme to make environmental degradation dependent on the number of people, the average of resources used by each person (measured by the GDP per capita) and the amount of environmental pollution per unit of resource (which could be measured by the number of tons of CO₂ per unit of GDP released into the atmosphere). Thus, in developing countries, the size of the population and the resulting degradation are often the most decisive factors. However, in developed countries, the main components are the high level of resource utilisation and the pollution generated.

In our research, with data provided by the World Bank, we have calculated the Ehrlich and Holdren index for all countries in the world (1961-2012). Then we compared the results, country by country, with mortality rates and R&D investments. Mortality rates, according to Amartya Sen (Sen, A. and Kliksberg, B, 2007:112), give the best picture of health and disease levels in a population. We have also employed R&D investments in our comparison to reflect the efforts made by economic agents to improve the situation, by putting technological innovations in the service of sustainability. Other variables that measure this phenomenon in more detail will be sought in further investigations. The panel data technique was employed to obtain the econometric estimations.

2.1 Bibliographic review

Sometimes, the Economy has been utilised as one of the classic solutions to lessen the impact of our activity on the planet and improve environmental quality. However, the debate is heated. For example, not all experts agree about accepting that prices of the products should be based on total cost (external plus internal in the short and long term). Nor do they agree when it comes to relying more on the regulations than on market forces, or to putting more emphasis on the control and prevention of pollution. A list of possible economic solutions to pollution and waste of resources is provided in Miller (2002:404) (Table 1).

Table1. Economic Solutions to pollution and waste of resources.

<u>Solution</u>	<u>Internalise external costs</u>	<u>Innovation</u>	<u>International competitiveness</u>	<u>Administrative costs</u>	<u>Increase government income</u>
<u>Regulation</u>	partially	<u>Can stimulate</u>	<u>Decrease *</u>	<u>High</u>	<u>No</u>
<u>Subsidies</u>	<u>No</u>	<u>Can stimulate</u>	<u>Increase</u>	<u>Low</u>	<u>No</u>
<u>Removal of harmful subsidies</u>	<u>No</u>	<u>Can stimulate</u>	<u>Decrease *</u>	<u>Low</u>	<u>Yes</u>
<u>Marketable rights</u>	<u>Yes</u>	<u>Stimulate</u>	<u>Decrease *</u>	<u>Low</u>	<u>Yes</u>
<u>Green taxes</u>	<u>Yes</u>	<u>Stimulate</u>	<u>Decrease *</u>	<u>Low</u>	<u>Yes</u>
<u>User fees</u>	<u>Yes</u>	<u>Can stimulate</u>	<u>Decrease *</u>	<u>Low</u>	<u>Yes</u>
<u>Pollution prevention bonus</u>	<u>Yes</u>	<u>Stimulate</u>	<u>Decrease *</u>	<u>Low</u>	<u>No</u>
<u>* Unless more productive and cost effective technologies are developed.</u>					

Source: Miller, T.G.(2002)

Regarding the relationship between taxation and the environment, Puig Ventosa (2010) found that in Spain, 2000-2005, allowances of tax deductions for expenditure on R & D and technological innovation induced companies to increase environmental investments in the years following their application. Nevertheless, he did not find sufficient evidence of a positive impact caused by fiscal allowances on innovation and development.

Another interesting approach is based on knowledge of the opinion of companies regarding the implementation of sustainable management strategies in times of crisis like the present. As a result of the financial circumstances, many companies, have been forced to curtail their spending, including that related to Corporate Social Responsibility (CSR), since it generates more costs (Orlitzky et al.,2003;. Fernandez-Feijoo, 2009). Others firms think that some CSR initiatives could be delayed or cancelled due to the financial crisis (Njoroge, 2009). However, at the same time, the

global financial crisis also provides wide opportunities for responsible companies in terms of brand reputation, employee satisfaction, economic efficiency and improved productivity.

Although social initiatives represent an additional financial cost, in times of crisis, we recommend the implementation of CSR in seven areas of consensus: innovation, workplace environment, the role of stakeholders, business strategy, market orientation, investor confidence and internal revision (Porter and Kramer, 2002; Fernandez-Feijoo, 2009).

Karaibrahimoglu (2010) investigated the performance of CSR in the period 2007 (before the financial crisis) and 2008 (beginning of the crisis in the American market) from the perspective of stakeholders. The study used a sample of 100 firms randomly selected from the "Fortune 500" ranking. The performance analysis was done by means of a content analysis of non-financial annual reports. The results show a decrease in CSR projects due to the financial crisis. This decrease is greater in the U.S. than in Europe.

However, Giannarakis and Theotokas (2011) using a transformation in the levels of implementation of the GRI (Global Reporting Guidelines) for evaluating the responsible performance of 112 companies in 2007-2010, obtained an increase in the performance of the responsible companies before and during the financial crisis, except for the period 2009-2010.

The results of the work of Jacob (2012) show that the financial crisis of 2008 had a clear impact on CSR initiatives in many companies, due to the exceptional pressure that companies had to face to survive; with massive layoffs and cuts in spending on community involvement programs. However, not all the impacts of the crisis were negative. Some areas related to CSR were boosted and were reinforced after the crisis, such as corporate governance, environmental policies and compensation policies. The companies gave more importance to issues related to interest groups that they perceived as the most influential. Therefore, a subject such as environmental policies constituted a risk if the "green investors" were to decide to withdraw their support. Jacob shows that social risks affecting the business reputation are explicitly presented in the annual reports with direct reference to environmental and human rights issues. The supply chain management and the risks associated with compliance with codes of business conduct are also highlighted in these reports. The importance of social risks and their impact on the reputation of companies is usually made explicit in internal reports but not in published annual reports on CSR practices.

From the consideration of CSR practices in a context of strategic positioning of companies, Fernandez-Feijoo (2009) combines the concepts of CSR and crisis, concluding that, in times of crisis, CSR can go from being considered a threat to becoming an opportunity. The idea is that the economic crisis accentuates certain business needs that can be solved by the implementation process of CSR. Such needs include innovation, the work environment, the role of stakeholders, business strategy, market orientation, investor confidence and a deep inner revision.

The implementation of responsible practices requires an innovation process that is the key to achieving long-term survival of the company, which is perfectly compatible in periods of crisis. At the same time, CSR provides a desirable work environment where motivation and corporate culture permit facing periods of crisis. CSR creates an alliance with stakeholders that reorients the perceived risk of these crisis periods to the company. From the point of view of business strategy, CSR is reinforcement for the process. CSR strengthens transparency and communication of the company, allowing it to fortify its market position. Transparency and communication prevent distrust of investors, something critical in times of crisis. In short, the development of CSR implementation processes in businesses compel an internal revision of identity, modes of operation and attitude towards totally compatible responsible values in times of crisis, with the guarantee of its survival. However, we can find various business reactions; some opt to strengthen responsible practices as a strategy to combat the crisis and others, on the contrary, seek to reduce the costs associated with CSR in the short-term to meet the challenges imposed by the crisis (Yelkikalan & Köse, 2012).

What this crisis has clearly shown is that CSR is a phenomenon that is here to stay. This is not a fad or a temporary phenomenon. CSR is increasingly linked to the business strategy of strengthening businesses in the long run. The partnership strategy with stakeholders provides a clearer character to traditional competitive strategies. We cannot expect CSR to be the only solution for crisis; neither can the adjustment processes on employment or wages be avoided. However, it is important to evaluate its cumulative positive effects on relationships with other social and economic agents, as well as in relation to the protection and preservation of the environment.

Finally, we have analysed some of the most important recommendations made by some international organisations to promote sustainable development and help curb climate change.

Thus, the World Bank, in its 2010 report, reached the following fundamental conclusions:

1. The reduction of poverty and sustainable development remain key priorities at the international level.
2. Despite the above, climate change must be addressed urgently. It is estimated that developing countries will bear between 75% and 80% of the cost of the damage caused. In Africa and Southern Asia alone, it would cause a permanent reduction in GDP of between 4% and 5%.
3. It is unlikely that economic growth by itself would be sufficiently fast or equitable to counter threats from climate change.
4. So what is needed is an immediate revolution in the energy sector to spread already available technologies, with low carbon emission levels, accompanied by substantial investment in the next generation of technologies. This is one of strategic sectors for entrepreneurship.

5. It must begin with the high-income countries. They should take steps to reduce their own emissions. This would free some "pollution space" for developing countries. Furthermore, it should have international support to promote the exchange of knowledge, technology and information. This would be another important strategic direction for the business sector.
6. It is estimated that in the coming decades energy systems should be transformed worldwide to reduce global emissions by between 50% and 80%. This will require that new infrastructure projects be built to withstand extreme conditions. Likewise, it is necessary to increase agricultural productivity and efficiency in water use to feed 3,000 million people without subjecting ecosystems to greater dangers– another new strategic direction for the business investment sector.
7. Finally, it calls for a global climate deal that is fair and effective that would involve new forms of financial and technical assistance, both for adaptation and to achieve growth with low carbon emission levels in developing countries. This is another business opportunity for high-tech companies in developed countries.

Meanwhile, the UNDP 2013 Human Development Report affects virtually the same issues as those highlighted by the World Bank. That is, it highlights the rise of the South, and what they call the "drivers" for more effective development: a developmental dynamic state, the ability to connect with global markets and the promotion of social inclusion and human development of large amplitude. That is to say, trade relations between Southern countries are increasing, although the need for international cooperation to carry out all the policies is still needed, mainly in areas such as education, health and the environment, not to mention the great infrastructure investments. All of this represents a wealth of opportunities for innovative companies and for generating clean and sustainable technologies.

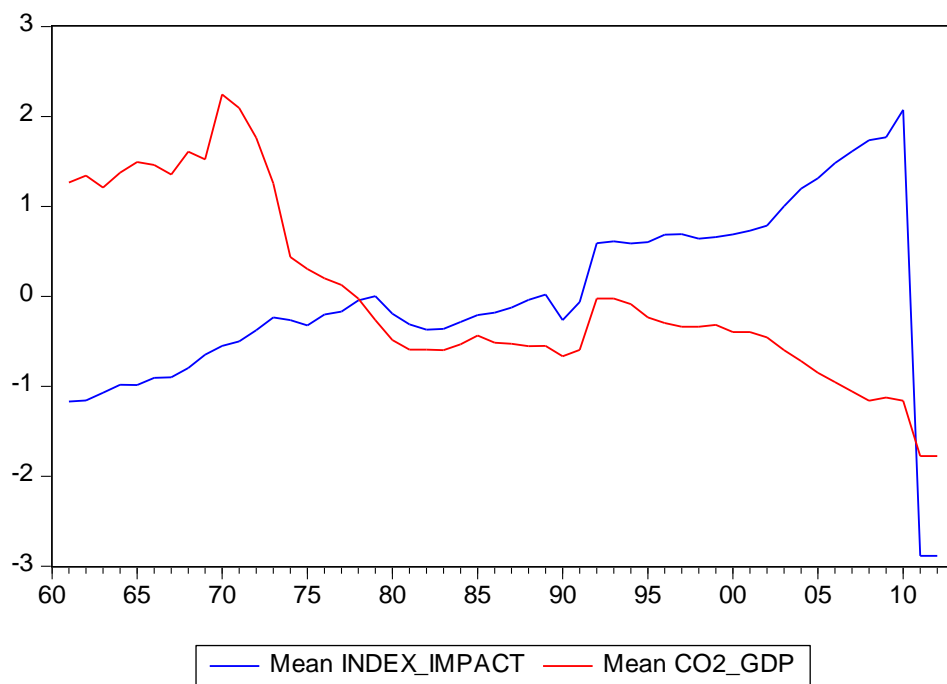
Regarding the service sector, we believe that their contribution to climate change must be analyzed through the transport subsector, because the growth of economic activity and the transport models (Alcántara and Padilla, 2010: 25) are two main factors behind the increase in CO₂ emissions worldwide. Some studies estimates his contribution between 13 and 25% of total CO₂ emissions in the world (Transportation Commission, 2010: 27). These figures can be corroborated with the series offered by the World Bank¹⁷⁸, which reports that emissions in 2010 reached 33.615 million Metric Tons of CO₂, of which 5,811 were generated by the transport sector (including domestic aviation, road and rail transportation of people and products). These modes represented in 2010 over 17% of total emissions, excluding marine bunkers and international aviation.

2.2 Econometric estimates

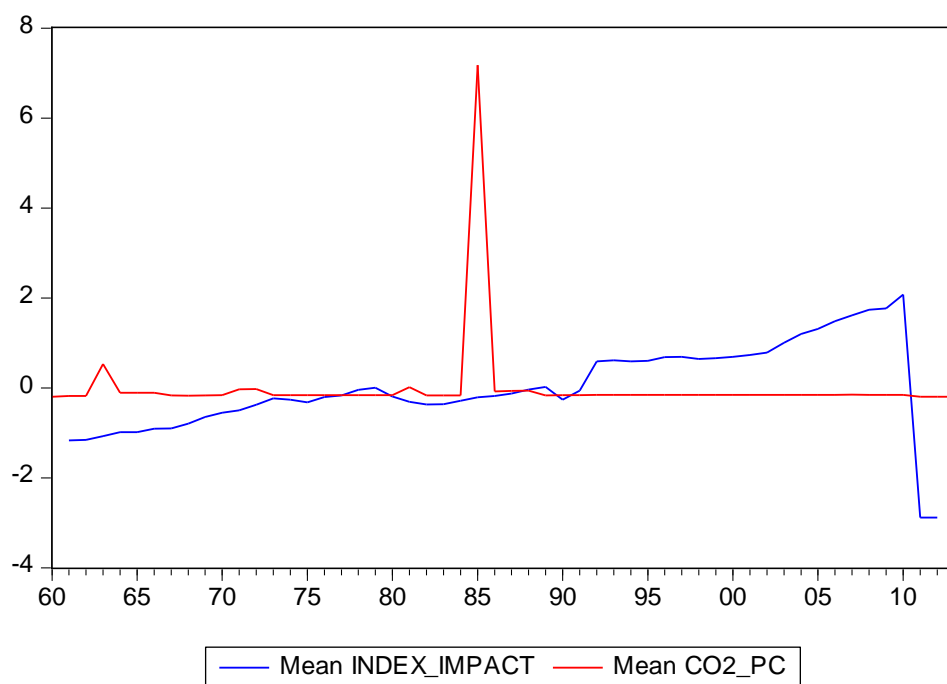
We have made a first econometric estimation through panel data techniques. For this we have used the data provided by the World Bank, from 1961 until 2012, such as GDP per capita, total tons of greenhouse gases that are released into the atmosphere per unit of consumption and total population, for each of the 214 countries registered. With these three variables, an index of environmental impact was built, following the design from the 1960s of biologist Paul Ehrlich and physicist John Holdren, referred to above. Once this index was developed, we first built a model that attempts to analyse the relationship between the same two key variables. One is the level of $R + D + i$ investment in countries in which some funds are being devoted to the improvement and implementation of new technologies to help combat climate change, among others the annual mortality rate was included. Mortality rates, according to Amartya Sen, give the best picture of health and disease levels in a population.

Results and some graphs are shown in the relevant section. Thus, with regard to the comparison between the impact index built and the CO₂ emissions (Graph 1 and 2), we see that the evolution is different in all cases, independently the comparison was made using the CO₂ emissions per unit of consumption (CO₂_GDP) or per population unit (CO₂_PC). Comparing index and poverty (Graph 3), we see that growth is sustained and almost parallel. However, in relation with the mortality variable (Graph 4), we see that both intersect around the 90s, following a growing trend rate impact compared to a downward mortality. Finally, the comparison of investments in $R + D + i$ (Graph 5) shows an upward trend in both.

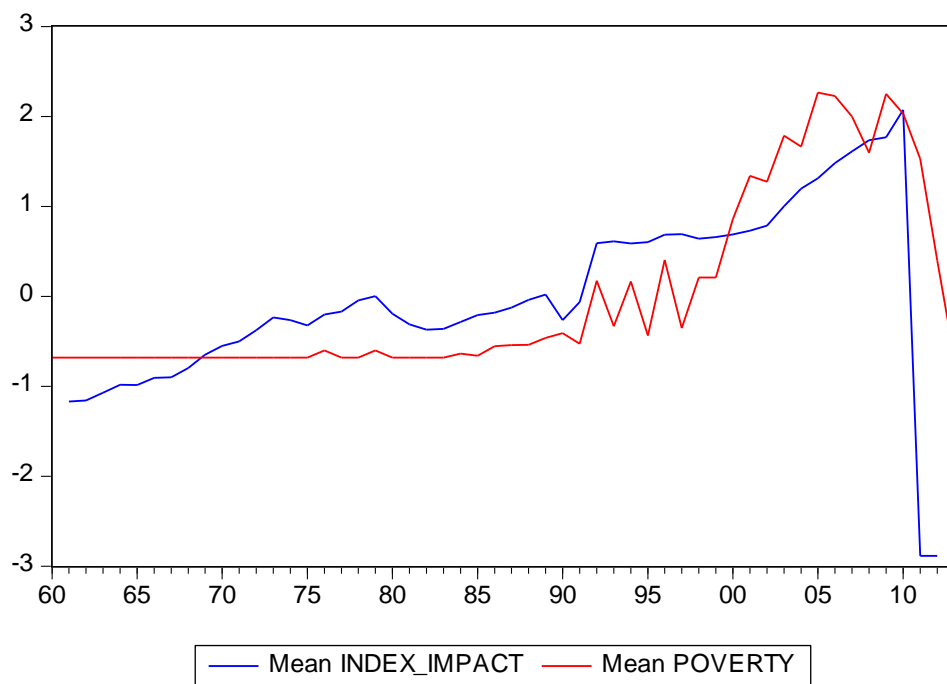
¹⁷⁸ <http://datos.bancomundial.org/indicador/EN.CO2.TRAN.MT>



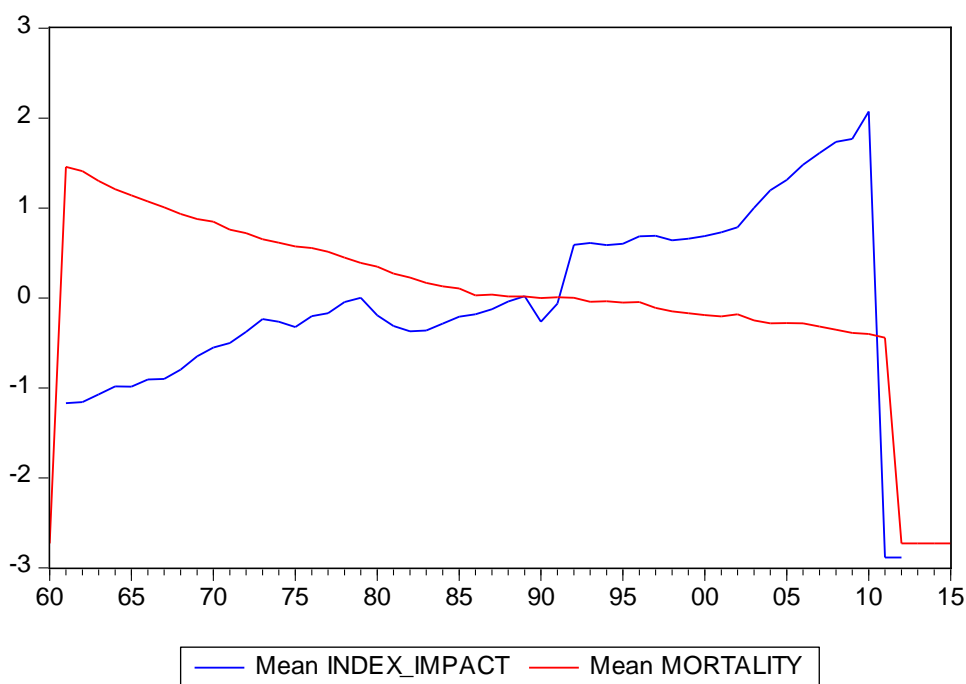
Graph 1



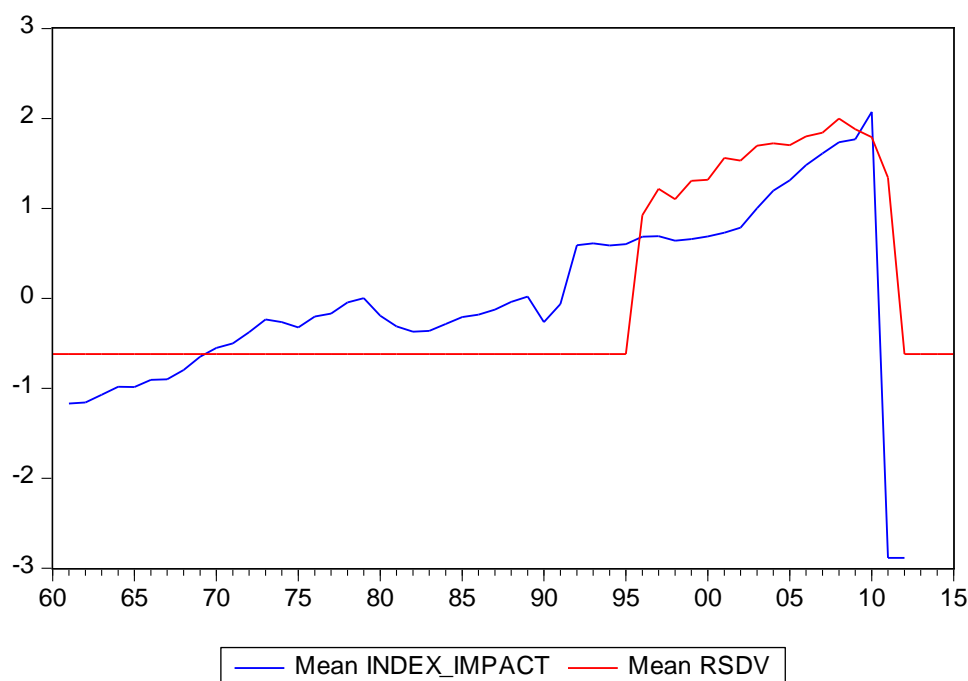
Graph 2



Graph 3



Graph 4



Graph 5

We made two fixed effects econometric estimates, into sections and years. In the first case (Table 2), we try to estimate the effect that is caused by the environmental impact index calculated on the mortality rate, which, as was said, would be the variable that gives us the best view of health and disease levels in a population, as indicators of human development. In the second estimate (Table 3), we analyse the effect such an impact has on global investments in R + D + i (without detailing, for the moment, what percentage of them is dedicated to investment in renewable energy or other technologies to help curb climate change).

Table 2. Effect of environmental impact index on mortality.

Dependent Variable: MORTALITY

Method: Panel Least Squares

Date: 08/11/14 Time: 14:07

Sample (adjusted): 1961 2012

Periods included: 52

Cross-sections included: 205

Total panel (unbalanced) observations: 8368

White cross-section standard errors & covariance (d.f. corrected)

WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INDEX_IMPACT	4.17E-10	1.81E-10	2.300219	0.0215
C	9.995998	0.018092	552.4962	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Period fixed (dummy variables)

R-squared	0.840410	Mean dependent var	10.03761
Adjusted R-squared	0.835373	S.D. dependent var	5.628845
S.E. of regression	2.283865	Akaike info criterion	4.519846

Sum squared resid	42307.29	Schwarz criterion	4.735820
Log likelihood	-18654.04	Hannan-Quinn criter.	4.593604
F-statistic	166.8470	Durbin-Watson stat	0.180549
Prob(F-statistic)	0.000000		

Table 3. Effect of rate of environmental impact on investment in R & D + iç.

Dependent Variable: RSDV

Method: Panel Least Squares

Date: 08/13/14 Time: 10:10

Sample (adjusted): 1961 2012

Periods included: 52

Cross-sections included: 205

Total panel (unbalanced) observations: 8368

White cross-section standard errors & covariance (d.f. corrected)

WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INDEX_IMPACT	2.82E-10	7.08E-11	3.987271	0.0001
C	0.113991	0.007060	16.14656	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Period fixed (dummy variables)

R-squared	0.416135	Mean dependent var	0.142141
Adjusted R-squared	0.397707	S.D. dependent var	0.500709
S.E. of regression	0.388588	Akaike info criterion	0.977634
Sum squared resid	1224.763	Schwarz criterion	1.193608
Log likelihood	-3833.422	Hannan-Quinn criter.	1.051392
F-statistic	22.58170	Durbin-Watson stat	0.453008
Prob(F-statistic)	0.000000		

In the first case, a positive and significant relationship between index environmental impact and the mortality rate is observed, indicating that the damage that climate change is causing the planet, is having its effects in increased mortality, globally speaking. If you look at the table of fixed effects coefficients by countries (Table 4), it can be seen that the largest effects are surprisingly in some developed countries (Germany, Belgium, Japan, United Kingdom...), plus China, Russia and North Korea. If we analyse the fixed effects coefficients by years (Table 5), in the period of 1983-2010 they become negative.

Table 4. Cross-section fixed mortality.

COUNTRY	Effect	COUNTRY	Effect	COUNTRY	Effect
ARE	-6.410038	CUB	-2.717236	HTI	3.486273
ATG	-2.777609	CZE	1.622303	IND	-0.884573
AUS	0.940102	DEU	1.734868	IRL	-0.078202
BEL	7.022830	DOM	-0.050542	ISR	-0.650257
BEN	8.737433	DZA	-1.879168	ITA	-3.205088
BGR	-5.680032	ERI	-1.774502	JPN	1.211796
BOL	-1.940309	FRO	-2.025266	KOR	-0.759942
BRA	-0.035290	FSM	4.491392	KSV	-6.008732
BRB	-5.542220	GAB	0.622863	KWT	1.578831
BRN	2.586199	GBR	1.867947	LAO	-2.673436
CHN	7.120821	GRD	-5.343795	LTU	0.157892
PAIS	Effect	PAIS	Effect	PAIS	Effect
MDA	5.154110	QAT	3.121124	URY	-0.510311
MDG	-1.159346	ROU	5.113802	USA	-3.267171
MDV	-3.424514	RUS	9.521424	UZB	-2.609622
MEX	-7.997811	RWA	-2.687698	VCT	-2.216303
MHL	0.207436	SAU	2.263457	VEN	-4.252489
NER	-1.862596	SWE	3.997190		
NGA	-0.341680	SWZ	-4.594171		
NIC	4.417425	SXM	-3.309146		
NLD	-2.235700	SYC	9.989984		
NOR	-1.039852	SYR	4.635699		
.....

Table 5. Period fixed mortality.

T	Effect	T	Effect
1961	4.757526	1988	-0.738543
1962	4.540597	1989	-0.734726
.....
1981	0.264484	2008	-2.282449
1982	0.029739	2009	-2.466719
1983	-0.120857	2010	-2.542639
1984	-0.224293	2011	-2.596756
1985	-0.349390	2012	-10.93319

Regarding the second estimate, a positive and significant effect on the index of investments in R + D + i, is also observed, many of them being aimed at new technologies and renewable energy, which may be helping that the effects of the said impact would not be even greater. Analysing the fixed effects of countries for this case (Table 6) shows that other countries like Brazil or Russia are also added to the list of developed countries. With respect to the fixed effects for years (Table 7), the period of greatest effect in this case is between 1996 and 2011.

Table 7. Cross-section fixed R & D + i.

COUNTRY	Effect	COUNTRY	Effect	COUNTRY	Effect
ATG	-0.173492	CZE	0.595934	IND	-0.135069
AUS	0.114191	DEU	0.686531	IRL	0.284212
AUT	0.560144	DJI	-0.205988	IRN	-0.099099
AZE	-0.088480	DMA	-0.173424	IRQ	-0.124788
BDI	-0.099458	DNK	0.595114	ISL	0.435856
BEL	0.445547	DOM	-0.116819	ISR	1.168538
BEN	-0.114302	DZA	-0.111299	ITA	0.130455
BFA	-0.074721	ECU	-0.099347	JAM	-0.113878
BGD	-0.118375	EGY	-0.070928	JOR	-0.112171
BGR	0.039943	ERI	-0.298153	JPN	0.540528
BHR	-0.199396	ESP	0.163114	KAZ	-0.168854
BHS	-0.114747	EST	0.468072	KEN	-0.107595
BIH	-0.326645	ETH	-0.179085	KGZ	-0.149740
BLR	0.222177	FIN	0.910131	KHM	-0.174763
BLZ	-0.115530	FJI	-0.114186	KIR	-0.142244
BMU	-0.091786	FRA	0.446710	KNA	-0.114015
BOL	-0.072481	FRO	-0.325894	KOR	0.621363
BRA	0.049390	FSM	-0.224739	KSV	-0.382588
BRB	-0.114215	GAB	-0.083491	KWT	-0.092396
BRN	-0.125575	GBR	0.276416	LAO	-0.216059
CAF	-0.114041	GIN	-0.233343	LBY	-0.283951
CAN	0.358223	GMB	-0.125081	LCA	-0.151343
CHE	0.100325	GNB	-0.142284	LIE	-0.131363
ABW	-0.345943	COG	-0.114272	GUY	-0.114376
COUNTRY	Effect	COUNTRY	Effect	COUNTRY	Effect
MDG	-0.065253	ROU	0.014527	URY	-0.049215
MDV	-0.190663	RUS	0.104158	USA	-0.573236
MEX	-0.064093	RWA	-0.114109	UZB	-0.299425
NLD	0.431649	SWZ	-0.114137		
NOR	0.282792	SYC	-0.077582		

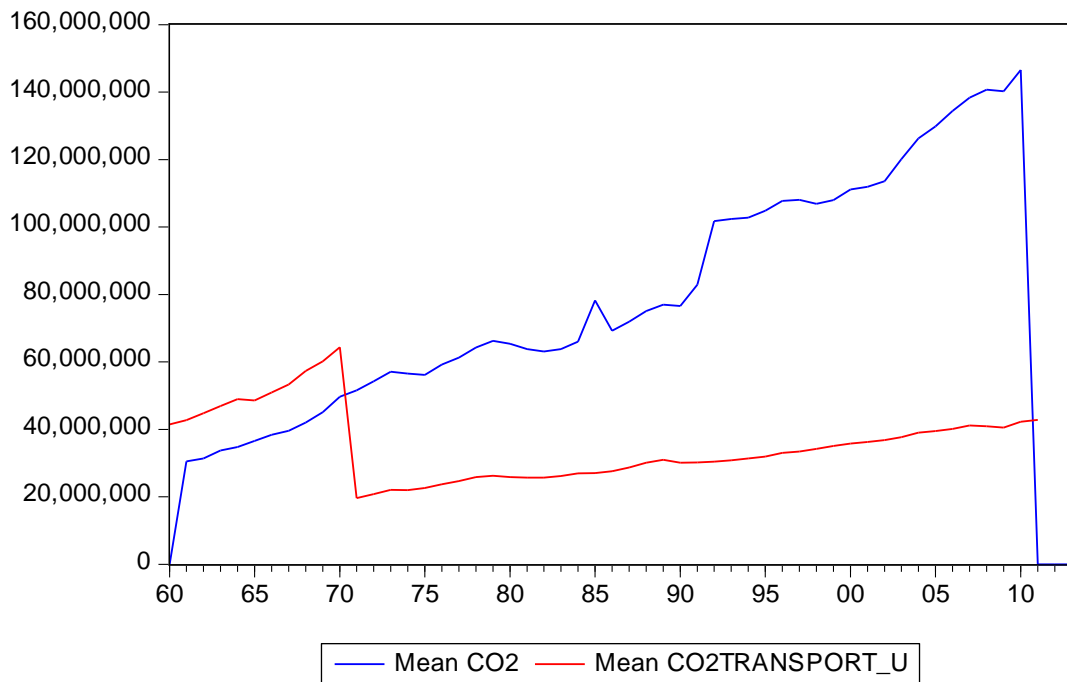
Table 8. Period fixed R & D + i.

T	Effect	T	Effect
1960	-0.085421	1988	-0.107630
1961	-0.140233	1989	-0.108991
.....
1966	-0.133081	1994	-0.107253
1967	-0.129496	1995	-0.108183
1968	-0.130405	1996	0.168385
1969	-0.131790	1997	0.216318
.....

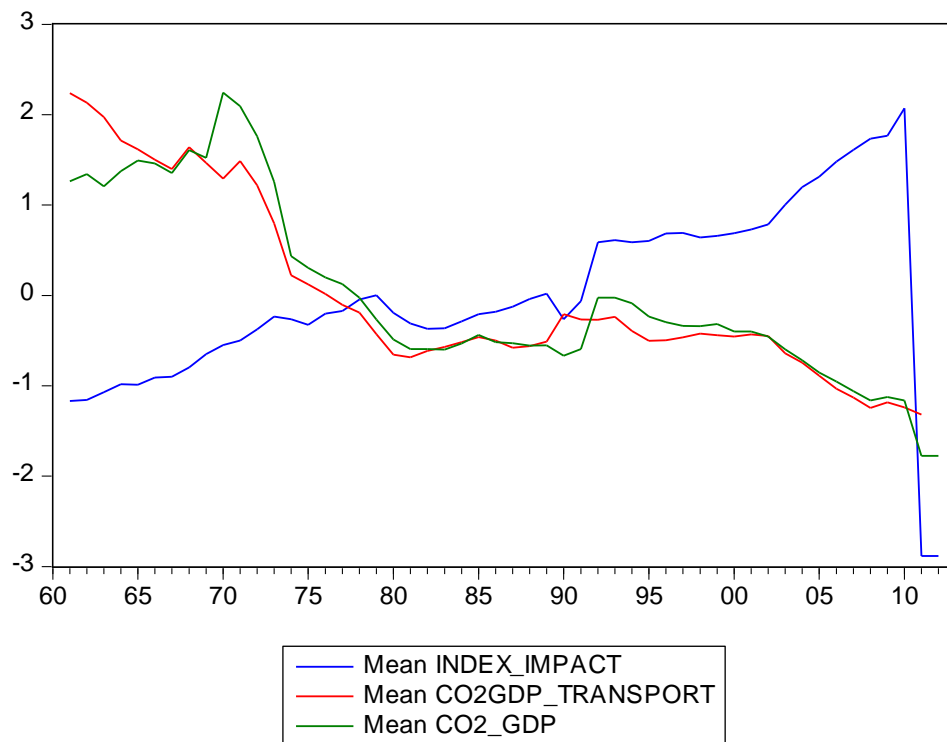
T	Effect	T	Effect
1983	-0.113611	2011	0.280446
1984	-0.113178	2012	-0.074677

2.3 Transport's contribution to climate change.

Using data from the World Bank, we have built several graphs. In Graph 6, the evolution of the total CO2 emissions compared to transport emissions (in metric tons) is shown. In Graph 7 we compare the impact index we have built with total CO2 emissions per GDP, both global and due to transport. It is noted that the trend of both are similar.



Graph 6



Graph 7

To study the link between CO2 emissions resulting from the transport and the environmental impact index a specific econometric estimation was carried out. The results can be seen in Table 8, and indicates that the influence of transport emissions in the overall impact index is statistically significant but negative, which could be an evidence of the positive results from the previous international efforts described above, at least in developed countries. In fact, when calculating the country fixed effects (Table 9) we can see that in developed countries fixed effects coefficients are higher.

Table 9. INDEX_IMPACT/CO2GDP_TRANSPORT.

Dependent Variable: INDEX_IMPACT

Method: Panel Least Squares

Date: 08/13/14 Time: 19:31

Sample (adjusted): 1961 2011

Periods included: 51

Cross-sections included: 134

Total panel (unbalanced) observations: 4915

White cross-section standard errors & covariance (d.f. corrected)

WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CO2GDP_TRANSPORT	-1.18E+17	2.97E+16	-3.984131	0.0001
C	2.00E+08	8307041.	24.02377	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Period fixed (dummy variables)

R-squared	0.866303	Mean dependent var	1.66E+08
Adjusted R-squared	0.861102	S.D. dependent var	6.02E+08
S.E. of regression	2.24E+08	Akaike info criterion	41.33320
Sum squared resid	2.38E+20	Schwarz criterion	41.57786
Log likelihood	-101391.3	Hannan-Quinn criter.	41.41903
F-statistic	166.5679	Durbin-Watson stat	0.494261
Prob(F-statistic)	0.000000		

Table 10. Cross-section fixed CO2GDP_TRANSPORT.

PAIS	Effect	PAIS	Effect	PAIS	Effect
ARM	-2.01E+08	CUB	-1.65E+08	HTI	-2.22E+08
AUS	88945184	CYP	-1.90E+08	HUN	-99406978
AUT	-1.14E+08	CZE	-1.19E+08	IDN	11617615
AZE	-1.53E+08	DEU	1.99E+08	IND	6.20E+08
BEL	-63601740	DNK	-1.25E+08	IRL	-1.39E+08
BHR	-1.87E+08	EGY	-82545809	ISR	-1.56E+08
BIH	-1.93E+08	ERI	-2.15E+08	ITA	1.82E+08
BLR	-1.42E+08	ESP	42038462	JAM	-1.70E+08
BOL	-1.55E+08	EST	-2.09E+08	JOR	-1.48E+08
BRA	54605324	ETH	-2.08E+08	JPN	7.43E+08
BRN	-1.92E+08	FIN	-1.26E+08	KAZ	-50771661
BWA	-2.00E+08	FRA	2.19E+08	KEN	-1.72E+08
CAN	2.67E+08	GAB	-2.03E+08	KGZ	-1.54E+08
CHE	-1.52E+08	GBR	3.95E+08	KHM	-2.14E+08
CHL	-1.44E+08	GEO	-1.95E+08	KOR	84817979
CHN	2.81E+09	GHA	-1.71E+08	KSV	-2.27E+08
CIV	-1.90E+08	GRC	-1.16E+08	KWT	-1.43E+08
PAIS	Effect	PAIS	Effect	PAIS	Effect
LKA	-1.67E+08	POL	1.24E+08	URY	-1.83E+08
LTU	-1.98E+08	PRT	-1.36E+08	USA	4.49E+09
MAR	-1.66E+08	ROU	-97990489	VNM	-1.40E+08
MDA	-1.86E+08	RUS	1.25E+09	YEM	-1.67E+08
MEX	1.32E+08	SAU	51039774	ZAF	1.45E+08

3 Conclusions

All econometric estimates in the panel data indicate that indeed the said index not only contributes to increased mortality, but also to increased investment in R & D. In addition, higher fixed effects are located in developed countries, including Russia and China, in the first case, and Brazil in the second. Periods in which the model detects changes in the temporal effects range from 1983 to 2010 in the first case, and from 1996 to 2011 in the second.

The literature supports that there are great investment opportunities for businesses in areas such as infrastructure, education, health and new technologies related to renewable energy.

The fact that this is giving important development in the Southern countries, and that trade relations between them is increasing, does not mean that there are not still opportunities for companies in developed countries, because their greater knowledge and technological development operates as an important factor to generate a positive collaboration with these countries for sustainable development.

With regard to the transport sector, although some studies estimate that the percentage of emissions represents 25% of the total, when we analyzed the correlation with the impact index, we obtained a statistically significant relationship, but negative, with fixed effects coefficients higher in most developed countries. This could be the evidence of the environmental positive effects derived from international changes in transport models.

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Utilizing strategic business networks in the field of SME's in Finnish wood product sector - A case study based on two companies

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In Finnish wood product industry, optimizing production has traditionally been in the main focus of the companies. Recently, domestic wood product markets have faced the tightening global competition and new players focusing customer value creation processes. In order to be able to serve customers comprehensively, business networks are needed. Despite the challenges, only a few of the wood product companies have started to re-think their business models and to challenge the dominant market structures. Therefore, the objective of this study is to understand different business models in the market through two case companies that have adopted new types of network business models

1 Introduction

Wood product industry is a market in a flux. Traditional production orientation does not seem to fulfil the requirements of a modern customer. Recently, domestic wood product markets have faced the tightening global competition and new players focusing customer value creation processes. The majority of the wood industry enterprises are small or medium (SME) and they struggle with lack of resources. Dynamic capabilities are needed to address rapidly changing environments (Teece et al., 1997). Jarillo (1993) argues that compared to vertically integrated companies, business networks are a more capable form of organization in order to react to rapid changes in market environment. By increasing the level of networking it might be possible to create more adaptable business models.

Services sector is growing everywhere in the world accounting more than 70 percent of the gross domestic product in regions such as USA, and European Union (CIA, 2012). In recent service marketing literature, discussion about services has been one of the main topics event to the degree that it may even be artificial to make a division between services and products. As Vargo and Morgan (2005) argue, also product-centric firms have always provided services. Raval and Grönroos (1996) use term 'value carrier' to describe the mechanism how a firm can offer a value proposition to a customer.

Construction sector and wood products are good examples of markets where the physical part of service plays an important role by not only enabling the basic level of service (e.g. living in a house) but also has potentially other levels of customer value. As one of the rare renewable raw-materials, forest-based products may have a bright future in the product-intensive service markets by having potential to substitute materials like plastic and concrete. Anyhow, customers still buy something beyond physical product (Vargo; Lusch, 2004) and companies should be more focused on customer value rather than their own production limitations.

Thus, while the tradition in forest product industry is very product oriented, networking might be one way to widen a company's resource pool to better be able to serve customers. Majority of the Finnish wood product companies are small or medium sized family-owned businesses. According to Ali-Yrkkö et al. (2007), this kind of companies usually have low incentives to become international. From the viewpoint of networking, Varamäki and Vesalainen (2003) argue participating to be one of the major challenges of SMEs. Despite the potential advantages of networking (Varamäki; Vesalainen, 2003; Pätäri, 2010; Toppinen et al., 2011) networks are dominantly not seen as strategic resources (Toppinen et al., 2011). According to Arhio (2007), networking carpentry enterprises are better able to innovate and to develop their business than the ones doing all in-house. Thus, while the benefits seem to be clear, there is lack of research in wood products industry considering networking.

2 Objectives and implementation

The objective of the study is to analyse and understand the networks of two case companies. Qualitative data were collected among the companies and their network partners by face-to-face themed interviews. Data were analysed by classifying them into themes. The companies were chosen on the basis of their activity using networks in their business.

Both companies operate in wood product business but are not actual competitors because of differing products and core competences. Company A is a relative new actor in wood construction sector. The business of it is built around wood panel construction including the whole building value chain from planning to installation and maintenance. The business model of company A is built on the idea of networking. Company B has a more traditional business model producing wooden claddings and other wooden construction materials. It sells a complete service package and has built a network to support installation and maintenance. The selected companies were interesting because of their wish to operate via a network-based business model.

The representatives of company A and B were given the same interview framework including the following themes: 1) current networks and members, 2) core competences and resources, 3) benefits and opportunities of networking, 4) obstacles and problems of networking, 5) potential future networks, 6) innovativeness, 7) trust, openness and

commitment. The expert of wood product industry was given an interview framework which was slightly more general in details but included the same themes. Many of the interviewees of the company networks also commented the whole wood product sector. The themes of the interviews are based on the theoretical framework. Interviews were implemented in the end of 2013. All the interviews were recorded and transcribed. This paper is based on the Master's thesis by Hämäläinen (2014).

3 Theoretical framework

Thorell (1986) defines network as a long-term relationship between two or more organisations. They can be loose or tight depending on the number of members, commitment and interaction (Williamson, 1975; Thorelli, 1986). Networks can be borderless, self-organizing systems that emerge from interaction or more intentionally created 'strategic networks' (Jarillo, 1993). Different types of networks require different types of management, and value creation logic has a fundamental role in influencing effective mechanisms for governance (Möller; Rajala, 2007). Ireland et al. (2002) name the selecting of network partners to be a starting point for efficient and profitable network. According to Morgan and Hunt (1994), trust and commitment are important elements for the relationship.

Möller and Rajala (2007) identify and place value nets on a value-system continuum (Figure 1). *Current business nets* in the left end have achieved relative stability and high level of resources. Vertical demand-supply nets and part of horizontal market nets are postulated to belong to this domain. *Business renewal nets* aim at increasing the efficiency of the existing nets by improving their offerings or specific parts of the business processes either continuously or as project-based, like customer solution nets. *Emerging business nets* concern radical, discontinuous and system-wide changes where new technologies, business concepts or even business fields are being created. Application nets are formed to support the race for achieving commercially viable business applications out of the evolving technology and they generally have a hub company. Dominant design nets generally consist of diagonal coalitions of partially competing and partially complementing companies that proactively try to create coalitions. Innovation networks are generally loose science and technology-based research networks. (Möller; Rajala, 2007).

<u>Current Business Nets</u>		<u>Business Renewal Nets</u>		<u>Emerging Business Nets</u>		
Vertical Demand-Supply Nets	Horizontal Market Nets	Business Renewal Nets	Customer Solution Nets	Application Nets	Dominant Design Nets	Innovation Networks
High level of determination						Low lever of determination
Stable, well-defined value system <ul style="list-style-type: none"> • Well-known and specified value activities • Well-known actors • Well-known technologies • Well-known business processes • Stable value systems 		Established value system, incremental improvements <ul style="list-style-type: none"> • Well-known value systems • Change through local and incremental modifications within the existing value system 		Emerging value system, radical changes <ul style="list-style-type: none"> • Emerging new value systems • Old and new actors • Radical changes in old value activities • Creation of new value activities • Uncertainty about both value activities and a actors • Radical system-wide change 		

Figure 1. Business net classification framework (Möller; Rajala, 2007).

4 Results

4.1 Company A network structure

Company A is a company producing wood elements. Even though it is not a proper hub company of the network, it has a central role in the network that offers substitutions for concrete elements in the construction sector. Company A has created a strong network around the main product to enable offering a tailored full building service package. Network consists of either companies or specialists of architectural planning, construction planning, building services, HVAC and ICT, material procurement and subcontracting, logistics and installation (Figure 2).

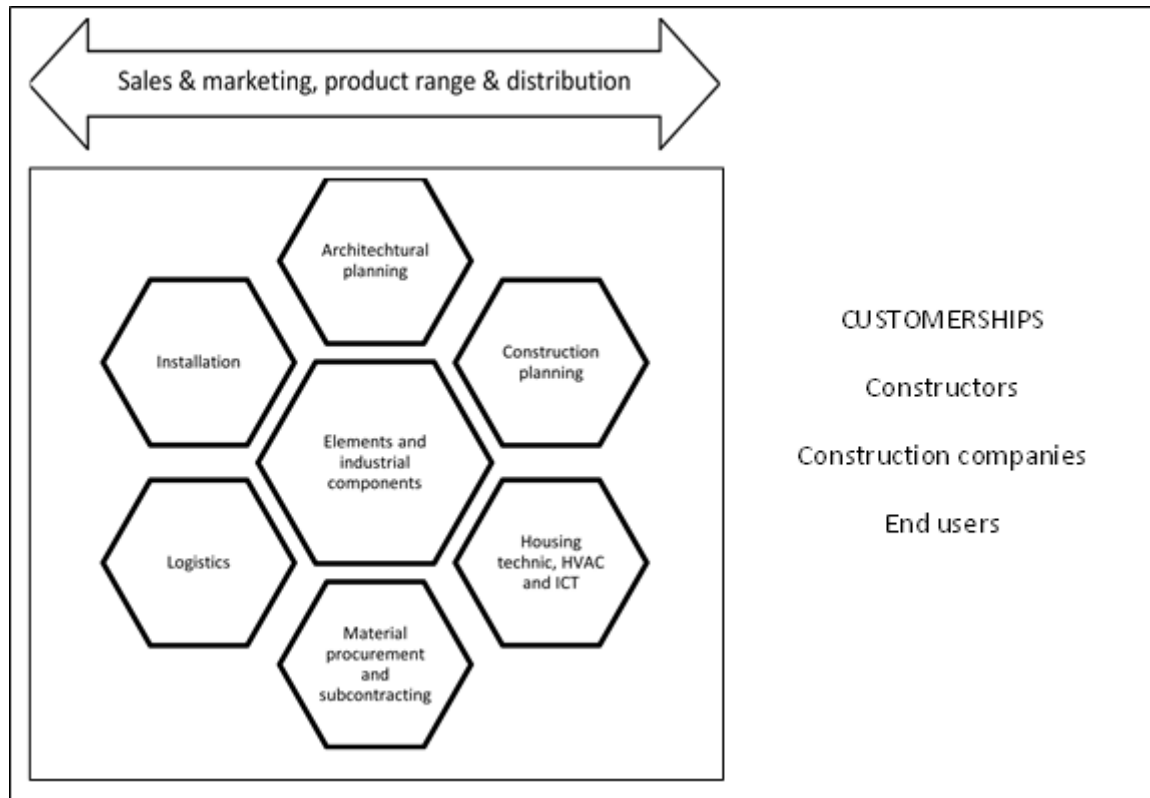


Figure 2. Company A network structure.

The main idea of the network is to work together in close connection to reach the shared goal together as balanced partners. To customers, the network offers complete and competitive building services. The members of the network thought that shared goals are crucial for success. This kind of a network was also said to be something unusual in the sector: “This may be the first one in Finland but were are not any kinds of pilots. This is a common way to build in Sweden, Norway, Austria, Switzerland and from Frankfurt onwards in German states”. Finnish construction culture was mentioned to be a subcontracting network lead by a hub company with relations more like trading than networking. Another success factor has been the choosing of network partners. In this network they have been selected on the basis of positive experiences of collaboration in previous projects, track record in wood construction sector, capabilities to commit to the shared goals, and ability to learn from one's past.

As benefits from networking the members mentioned increased capacity to offer larger entities and efficiency in marketing even though marketing is still done independently from the other network members. However, the respondents saw this last comment was given changing in the future. Thus, combining resources it is possible to offers services to a larger customer group and network offers prospects to get to the international markets. Potential innovativeness originating from the structure combining different kinds of specialists is also seen as benefit: “It is clear that this kind of network has potential to innovate and come up with new ideas and solutions. This alliance structure is innovative by its nature”. However, innovativeness in the wood product sector was criticized by one of the interviewees as chasing too much revolutionary ideas and forgetting the reality of everyday business.

4.2 Company B network structure

Company B manufactures wooden claddings and other construction materials and sells installation services for the products. It does not have own labour for installation but it uses a large network of installing companies (Fixure 3). Towards customers this seems like subcontracting but towards installation companies the collaboration is deeper. All the areas of responsibilities are clearly described between the network partners.

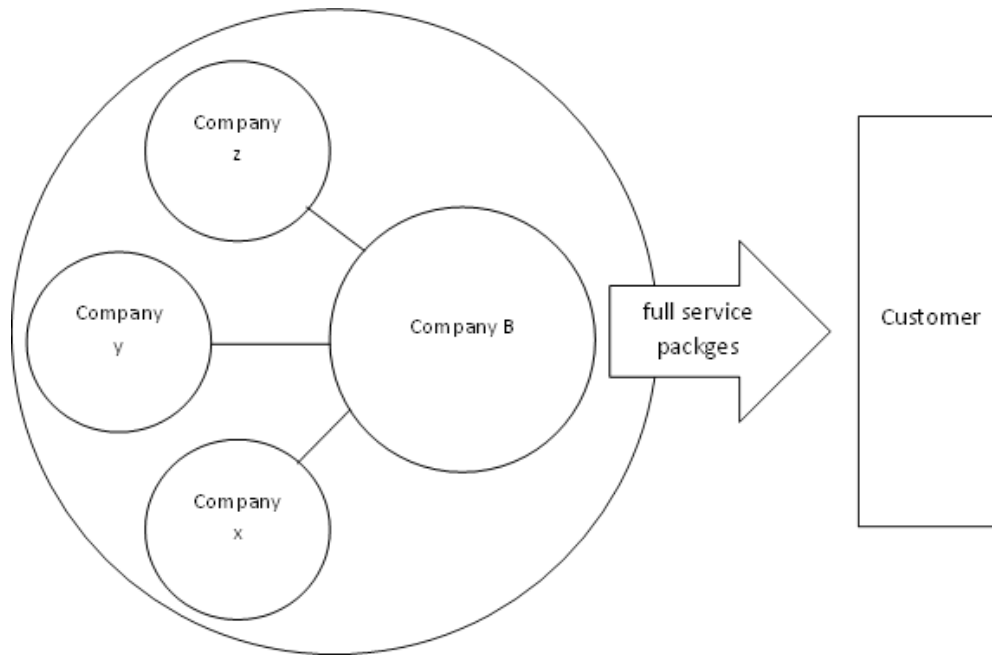


Figure 3. Company B network structure.

Networking started from customer needs of a large entity which helped the partners to concentrate to their own core competencies. Deep collaboration increases the total quality of the process in this kind of service: “You ruin the whole process if the quality of the installation is not desirable”. Choosing of network partners depends on their track records and reputation: “If we don’t accept some partner, the reason may be because of their poor management of finances”.

Interviewees were conscious of growth potential the network enables. By being able to offer large services it is possible to have customers outside their normal customer segments. For installation companies this means more work. Growth may set some challenges in the future because communication has until now been based on close geographic locations of the partners: “It is a real advantage to be so close to company B that we meet almost every day”.

Resources of the network of company B are currently sufficient but scalability of the network is questionable. For the present, installation companies are spatial and after a certain point they do not get more out of the potential growth if company B just seeks for more partners. There are also challenges about openness when company B is the only one of the network to negotiate with customers: “If we only could reach the level of openness when I was involved in negotiations”.

4.3 General comments concerning networks in the wood product sector

Among the interviewees, potential of networking was identified. According to the interviewees, especially concentrating on own core competencies: “If you have to offer variety of products, solutions, have a good marketing system, sales and visibility, the only way the SMEs can do it is to create a network or alliance with a coherent strategy”.

Despite experiences and positive attitude towards networking, lack of courage, fear of change and negative attitudes towards competitors as potential partners were mentioned to hinder the development: “I think it is a Finno-Ugric genetic error that we are handicapped as team-players. It is usually a want to dominate because of belief of knowing better than the partner. Envy is an obstacle.” Small players can only have a very limited assortment of products and services which was recognized to be a problem in marketing.

4.4 Key findings

As a summary of results (Table 1), the network of company A is close to intentionally created strategic value network that has members with clear roles and responsibilities (see: Möller et al 2005). Network of company A also had a shared goal of creating a substitute to concrete elements in multi-storage house construction. The network of company B instead, is closer to subcontracting network than strategic network. The partners have a wider variety of goals including offering complete installation process of wooden claddings, finding reliable and high-quality partners and increasing the size of the business. Track record and reputation were mentioned to be the most important partner selection criteria. Reasons for failures in networking were related to not obeying the shared rules (network A) and low quality (network B).

Table 1. Summary of the results.

	Network A	Network B	General industry practices now
Structure and business idea	A hub company and balanced network partners with a shared goal	A hub company with partners concentrating on their own core competencies	Networking at low level, opportunities identified
Objective of the network	Offer substitutes to concrete elements in the multi-story building market	Slightly differing objectives among partners, high quality wooden claddings with full services, economic value	Promoting export, becoming international, offering larger entities to customers
Network partners and selection criteria	Track record in wood construction sector, networking skills, members selected by benchmarking	Relationships and earlier experiences in collaboration, proper management of finances	Image, track record, quality of work; proper management of finances increasing
Benefits and opportunities	Innovativeness opportunity in a specialist network	Scalability if new partners are found	Improve profitability, larger entities for to customers
Resources	Lacking in installation and operative management of the industrial plant	Lack of salesforce and difficulties in finding good partners	Increasing role of customers requires resource integration for small companies
Openness, trust and commitment	Open atmosphere, dialogic and trustful culture that allows challenging	Commitment based on contracts, more openness needed, employing the installation companies increases trust	Openness and trust as starting point, technical documentations
Problems and threats	Current poor economic situation in the sector, copying the building system as a threat, internetwork resource allocation problems	Current poor economic situation in the sector, difficulties in finding new partners	Current poor economic situation as threat; suspicious attitude

Generally in the wood product sector, networks were seen to have potential especially for SMEs by offering them resources to be able to increase the current potential customer groups. Potential for improving cost efficiency was also identified. However, the culture in the industry is different. Short-term profits and subcontracting define usually collaboration. Suspicious attitude towards other players in the market was seen as an obstacle for cooperation and development. In addition, customers and end-users are rarely embedded in business models or decision making.

5 Discussion

The companies studied in this research have very different network business models. Even though company A has a central role, the network consists of balanced partners with a shared goal of creating a substitute for concrete building elements. All the partners have their own areas of responsibilities. The network of company B has a clearer role as a hub company. The collaboration has features of network business model but also of subcontracting. The members of the network of company B have not a clearly shared goal.

When considering the business net classification framework by Möller and Rajala (2007), the network of company A can be placed more on the right on the continuum compared to the network of company B (Figure 4). Network A consists mostly of old actors who have created a new-in-the-market value creation system. The network of company B is more stable and has an established value system reaching for incremental improvements. This network was found to offer a solution to a customer rather than created intentionally. However, company B does not have an own substitute to their services and in this context can therefore be defined to be network-oriented.

<u>Current Business Nets</u>		<u>Business Renewal Nets</u>		<u>Emerging Business Nets</u>		
		<i>Company B</i>		<i>Company A</i>		
Vertical Demand-Supply Nets	Horizontal Market Nets	Business Renewal Nets	Customer Solution Nets	Application Nets	Dominant Design Nets	Innovation Networks
High level of determination						Low lever of determination
Stable, well-defined value system <ul style="list-style-type: none">• Well-known and specified value activities• Well-known actors• Well-known technologies• Well-known business processes• Stable value systems		Established value system, incremental improvements <ul style="list-style-type: none">• Well-known value systems• Change through local and incremental modifications within the existing value system		Emerging value system, radical changes <ul style="list-style-type: none">• Emerging new value systems• Old and new actors• Radical changes in old value activities• Creation of new value activities• Uncertainty about both value activities and a actors• Radical system-wide change		

Figure 4. Networks of companies A and B on the business net classification network by Möller and Rajala (2007).

Reputation and resources were mentioned as important selection criteria for network partners. Both of the networks lack of some resources and some difficulties in finding proper partners. One reason may be the limited size of the market when operating in Finland but also the dominating suspicious attitude towards competitors as potential partners may be a reason. Both of the case companies also mentioned bad experiences of networking.

6 Limitations and themes future research

Qualitative case research was a proper method for the research and the objectives of understanding the networking of the selected companies was fulfilled despite the rather small numbers of interviews. However, the selected companies are not representing the companies in the field well but are rather special cases. This lowers the level of generalization of the research.

The companies in the market are small and mostly operating in the domestic market. This makes their scale small and other actors in the markets are seen more like threats than potential partners. One interesting topic for future research would be, why there are so few network-based business models in Finnish wood product industry even though their potential is recognized.

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Practices of social-business innovation

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This study focuses on social-business innovation as a new integrated approach to address the complexity of the social issue social as well as the business endeavour. The authors set up the following research questions that led empirical study and theoretical contribution: 1) how can we frame social-business innovation? Social-business innovation is not simply a new solution (goods or services) but a service provision of multiple benefits for several actors. It is an enabler of value, well-being and viability. In this perspective the study provides evidence of a different way of thinking and acting about problems or opportunities: a process involving reflections with various stakeholders not only on what to do but on how to do.

Three practices of doing social-business innovation are addressed: 1) engaging, 2) promoting, and 3) institutionalizing.

1 Introduction

The Europe 2020 strategy is about delivering growth that is: [smart](#), through more effective investments in education, research and innovation; [sustainable](#), thanks to a decisive move towards a low-carbon economy; and [inclusive](#), with a strong emphasis on job creation and poverty reduction (Europe 2020).

The Europe 2020 Strategy makes clear that the future wealth and wellbeing of citizens depends on smart, sustainable and inclusive economy. Societal challenges are of particular interest to companies, not as a charitable favour to society, but because they also provide a tremendous business as well as social potential (Moss-Kanter, 1999; Porter and Kramer 2011). The range of innovative opportunities opens up to companies able to ride the social trend. For example Unilever has launched the project of social open innovation (Sustainable Living Plan) within the corporate vision "to double the size of the business, whilst reducing our environmental footprint and increasing our positive social impact" (www.unilever.com/sustainable-living-2014 www.). Also IDEO launched OpenIdeo, an open innovation platform to engage the global community to solve "big challenges for social good" (<https://openideo.com/challenge>).

Moss-Kanter (1999) revealed that traditionally business viewed the social sector "as a dumping ground for spare cash, obsolete equipment, and tired executives" (p.123). However some companies have begun to approach social context as a learning laboratory to move beyond corporate social responsibility to corporate social innovation. These companies see social problems are economic problems: *they have learned that applying their energies to solving the chronic problems of the social sector powerfully stimulates their own business development. ...Not spare change, but real change-sustainable, replicable, institutionalized change that transforms schools, prospects, and neighbourhoods. And that means getting business deeply involved in non-traditional ways. Tackling social sector problems forces companies to stretch their capabilities to produce innovations that have business as well as community payoffs. ... This is not charity; it is R&D-a strategic business investment (p. 124).*

The slogan 'Doing well by doing good' reflects the changes in attitudes in many companies (Roper and Parker, 2013) whereas "the goal of business is not profit maximization alone, but also societal acceptability" (Lähdesmäki and Siltaoja, 2010, p. 214). A new kind of organizations joining a social or environmental mission with a business performance has appeared. These companies are not for-profit or nonprofit, but they are a sort of blend of the two; they are "for-benefit enterprises" (Sabeti, 2011), forming what has been called the fourth sector of economy (with a change in legislation in several Nations).

Management scholars have recently highlighted the need to integrate social and business perspectives in order to identify and prioritise the role of companies in pursuing social challenges at a higher level (Rubalcaba et al., 2013). Despite some progress, there is still a paucity of theoretical debate and empirical evidence on the link between the social and business innovation. Business innovations aim to satisfy market needs improving companies' economic performance (Trott 2008). Social innovations are defined instead as innovative activities and services that are motivated by the goal of meeting social needs (Pol and Ville, 2009) and improve the quality of life (Rubalcaba et al., 2012). There are no studies on a joint definition of what is a social-business innovation.

Furthermore while the existing literature on social innovation addresses the questions of what, where and who makes social innovation happen, by focusing on the role and the actions of non-profit and public organizations, some scholars (Llie and During 2012) propose an alternative perspective that deals less with the accountability of the social innovation process and more with acknowledging the practices of social innovation starting with individuals and groups in the communities. Also in business studies there is a growing interest in understanding the practices of innovation (Mele and Russo-Spena, 2015a, 2015b) to depict the role of actors, resources, activities and institutions.

The objective of paper is how to frame social business innovation. To address this aim we open up both the dimension of "what" social-service innovation is and the "practice" that is how social-business innovation is developed.

The paper is articulated as follows. First we present a literature review on business innovation and social innovation. Second, the methodology is illustrated. Then, the findings focus on innovative value proposition and practices of social business innovation. The work ends with discussion and some implications.

2 Literature review

Business innovation refers to a wide literature in business studies, while social innovation has roots in different domains such as sociology, economics and more recently management and marketing. We offer brief reviews to frame business innovation and social innovation.

2.1 Business Innovation

Business innovation concerns translating ideas into goods and services for which customers will pay. It must be replicable at economic cost for the company and it must satisfy a specific need in the market (Tidd, Pavitt and Bessant, 2001; Trott, 2008).

According to Drucker (2002) innovation is the means by which the entrepreneur creates new wealth by producing resources or using existing resources. The sources of innovation are multiple ranging from changes, opportunities and needs within the company, the industry and the market. Companies view markets' needs as opportunities to generate and develop new ideas, serve new markets and improve business performance. Innovation comes out from the effort to create purposeful changes in the company's economic potential. Innovation is driven thus by business motivations.

Within the business domain, innovation allows the company to feed its revenues pattern, increase market share and drive sustainable competitive advantage. Traditionally the value creation process behind innovation process looks at the customer as the recipient of the new output while the main beneficiary is the company.

Innovation debate in business studies has focused on three main topics among others: 1) the degree of newness of the innovation output; 2) the main sources of innovation patterns and 3) the process of innovation.

New ideas can be applied in product innovation or in process and organization innovation (Clark and Wheelwright, 1993; Nonaka and Takeuchi, 1995; Trott, 1998). The newness refers to small changes to and variations of existing products (incremental innovation) or to completely new products (radical innovation) related to a new technological paradigm or to a new market creation (Henderson and Clark, 1990; Garcia and Calantone, 2002). Technology and market are seen indeed as main drivers of innovation patterns: the technology-driven model (Henderson and Clark, 1990; Li and Calantone, 1998) sees the market as a recipient of research and development (R&D) breakthroughs while the market-driven model (von Hippel, 1988; Baker and Sinkula, 2005) regard market orientation as the main source of the R&D efforts. In both cases the development of new product and new service development follows a closed linear process well depicted in the stage gate model which proceeds with phases separated by gates (Cooper, 1988). This traditional model of innovation has been challenged by the open innovation model (Chesbrough, 2003) whereas the flow of innovation activities opens to external actors with whom the company can collaborate to increase its knowledge and resources assets. The cooperation enriches the creativity and the potential to develop innovations.

Studies within service-dominant logic (Vargo and Lusch 2004, 2008) have recently offered a fresh contribution to innovation debate. First of all, the conceptualization of innovation in terms of S-D logic is primarily based on the different meaning of service. Rather than being seen as an outcome (i.e., not as new goods or new services), innovation is perceived as a process wherein provider and user together seek out ways that enable them to successfully collaborate in resource integration, by fostering thus value creation. In this perspective the focus moves to innovative value proposition.

Second, the newness of an innovation seen from the perspective of S-D logic does not have to be technological; it can also refer to a product being used in new ways, as in a different context, place or time. The divide market/technology is overcome with the view that it is beneficiary, the person who determines the value of an innovation brought about by the integration of resources, context and experience (Vargo, Akaka, Weiland, forthcoming).

Third, S-D logic stresses that successful innovation relies on all participants collaboratively co-creating value within an open and democratized process because single companies do not have enough knowledge and resources to develop innovations (Lusch et al., 2010). Innovation is framed thus as the process by which stakeholders variously contribute, collaborate, cooperate, i.e the process is one of co-innovation (Russo-Spena and Mele, 2012). Such contributions occur in an integrated many-to-many way through A2A interactions (Gummesson and Polese 2009; Gummesson and Mele, 2010; Vargo and Lusch, 2011) in the open network and in the larger service ecosystem (Vargo and Lusch, 2011; Mele, Russo Spena and Colurcio, 2014). This view overcomes the traditional way of seeing the customer as the recipient of the newness and the company as the main beneficiary in terms of economic performance: all the company's stakeholders can benefit from innovation processes.

Recently, the process view has been stressed also by some studies adopting the practice-based approach to innovation (Hildreth and Kimble, 2004; Duguid, 2005). By advocating a contextual and process-oriented view of co-creation and innovation Russo-Spena and Mele (2012) and Mele and Russo Spena (2015a; 2015 b) address innovation

as a set of co-creation practices that involve an array of factors, including actors, actions and resources, in addition to the mere innovation output itself: innovators are seen as carriers of practices who perform actions through the use and integration of resources (symbolic, linguistic and material). The practice-based approach offers a broader view to frame innovation, Focusing on practices enables indeed scholars to see and analyze the social connections among individuals, collectives, organizations, institutions, and the social contexts in which these connections are formed.

2.2 Social innovation

Although the concept of social innovation is not new (Drucker, 1987), the boundaries of social innovation research stream have not yet been completely defined. The debate has boosted during the last decades, spurred notably by the growing interest in fields related to economics (public finance), entrepreneurship and management, technology, sociology and policy (Hans-Werner et al., 2012). Notwithstanding, some common features could be framed, the disagreement about what social innovation is and what is not is still strong

The attention of scholars has been concentrated differently (Hubert et al. 2010). In some studies the focus is strictly narrowed to the social instances addressing innovative efforts of organizations whose primary purposes are social. Other scholars claim for a broader concept of social innovation by referring to innovative activities exploiting social issues as opportunity to identify unmet needs and develop solutions that create new markets (Porter and Kramer, 2011).

2.2.1 *Social innovation: social demand perspective*

The social innovation debate has its roots in the social instances that respond to pressing social needs traditionally not addressed by the market. In the social demand perspective social innovation concerns complex issues in various areas of society - employment, poverty, housing, health care - and is directed towards vulnerable groups in society (Mulgan 2006). The most heralded approach to definition of social innovation is that of Stanford social innovation research team defining social innovation as a “novel solution to a social problem that is more effective, efficient, sustainable, or just than existing solutions and for which the value created accrues primarily to society as a whole rather than private individuals” (Phills et al., 2008: p. 39). The kind of value that innovation is expected to delivery is less tied to issues concerned with profit as Pol and Ville (2009) affirm: “*Social innovation involves new ideas improving quality or quantity of life, not necessarily linked with economic profits. The ultimate end of social innovation is to help create better futures*” (pag. 884).

In this sense social innovation rests on an integrated system of related products and services; it needs to provide benefits towards public or society instead of satisfying private issues (such as gains for entrepreneurs, investors and consumers) and to prove effects that are longer in the time. This has important implications not only in terms of goals and its beneficiaries, but also in terms of main actors as agent of innovation. Different scholars claim the social innovative activities as predominantly developed and diffused through organisations whose primary purposes are social (Mulgan 2006). They tend to limit social innovation domains to public and nonprofits organisations, implicitly or explicitly excluding firms and other for-profit organizations. Although scholars have made valiant efforts to broaden prevailing conceptions of social entrepreneurship and social enterprise (Hall et al. 2012), the trade-off between social and business innovation remains still preeminent in this perspective. While the business innovator is seen to place priority on improving firms’ competitive position by gaining short-term benefits (such as market share and profits), the responsibility to take care of society and prevent negative impacts in the long-term are the only challenges which a social-innovator deals with (Yunus et al., 2010). The managers and partners of social companies operate without seeking to add pecuniary or other materials gains to their assets and profits; when they occur they are in principle to be invested in the enterprise (Schoning, 2013).

Private companies have complementary roles as agent of social innovation and in some cases they use social issues as a business opportunity while also addressing economics concerns. In particular, the base-of-the-pyramid (BOP) and subsistence marketplace literatures have recently affirmed in the social debated as an attempt to merge social and business perspectives. These literatures suggest that companies can create profitable markets while also helping the poor in addressing their urgent needs (Anderson and Markides, 2007). Strategic social issues occur when companies accept social responsibility and integrate it into their core business strategy. The creation of new markets for BoP communities are seen as an opportunity that firm can grasp mainly through a re-design of product and delivery platform without changing their basic technology (Prahalad and Hammond, 2002). Two important and related aspects characterize innovation at the BOP: 1) the role of large firms in the market economy as innovators also penetrating the BoP markets; 2) the need of combining social and economic goals also through a new form of partners to be involved. By looking at the process of innovating with non-traditional partners, such as NGO, local communities and others, some scholars (Hall et al. 2014) argue that BOP innovations are in their nature collaborative involving both profit and no-profit businesses.

2.2.2 *Social innovation: the integrated perspective*

Hints towards the elaboration of advancement in the social innovation debate can be found in more recent contributions calling for a multidimensional and systemic approach (Roome, 2013) (see Table 1).

According to Schmidpeter (2012) addressing the societal challenges necessary postulate new approaches to their solution with new roles and interactions of various actors resulting in social innovation. In the integrated perspective social innovation works towards a systemic social change including changes in values, power, beliefs, practices and it focuses on the “collective” aspect of the process of innovation which cannot simply be reduced to the contribution of single actor no matter how extraordinary or grand it may be (Neumeier, 2012; Osburg and Schmidpeter, 2013; Rubalcaba, et al. 2013).

Social innovation is seen not only as a way to respond to new social problems that cannot be fixed with traditional business or policy instruments but as solution to more global challenges (including environmental challenges) ensuring economic performance too under a new integrated social-economic paradigm. As Viñals (2013) outlines it consists of putting innovative new systems into the place to bring up social change.

This perspective provides new meaningful insights as the plurality of news concepts they conveyed. Firstly, social innovation rises necessarily through a collective and participative process as it runs through interactions between a wider spectrum of actors including individual, public, private and third sector organizations and any others who are interested in solving a social problem (Rubalcaba et al., 2013). It is a networking based phenomenon that extends beyond simple products or service relationships and relies on the simultaneous development of organization, technologies, services and multiple network relationships (Le Ber and Branzei, 2010).

This integrated view puts into the focus also the implementation and diffusion of new practices rather than just narrowing innovation to the development of new ideas. Some authors define social innovation in terms of creating new social practices or new way of combining them (Hochgerner, 2013; Cajaiba-Santana, 2013). According to Hochgerner (2013) social innovation cannot be built up on the basis of established practices and it necessarily involves a renewal of resources, practices and schemas with the power to transform society and its practices.

The changes regard not only the way the social agents act and interact with each other, but the social context in which these actions take place through the creation of new social systems (Caulier-Grice et al., 2012; Hochgerner, 2013). How to complement technological and economic innovation with changes in attitudes and values, strategies and policies, organisational structure and processes comes in to the matter as well as responsibilities and tasks of different institutions involved.

The process of collective creation for social innovation is complex because of its networking implications; moreover it includes the idea of multi empowering agents who act and think collectively in the development and implementation of new ideas to promote social change (Rubalcaba et al., 2012; Cajaiba-Santana, 2013). The empowerment of individuals based on the revitalization of social aspects as well as the interplay between the top down and bottom up of innovation process activities are important in social innovation (Neumeier, 2012). Top-down activities from the main institutions (including business policies and regulation issues) are necessary for the materialization of social innovation; anyhow the bottom-up activities are the engine of social innovation and are linked to social and people empowerment.

Table 1. Definitions of social innovation in a broader systemic perspective.

Wesley and Antadze (2010)	Social innovation is a complex process of introducing new products, processes or programs that profoundly change the basic routines, resource and authority flows, or beliefs of the social system in which the innovation occurs. Such successful social innovations have durability and broad impact.
Neumeier (2012: p. 55)	Social innovations are non-material: their material outcomes are solely a supplementary result and they focus not on needs but on asset building Social innovation is “changes of attitudes, behaviours or perceptions of a group of people joined in a network of aligned interests that in relation to the group’s horizon of experiences lead to new and improved ways of collaborative action within the group and beyond.”
Rubalcaba, Di Meglio, Gallego (2013: p. 202)	Social innovation is participative, implies the process of social interactions between individual citizens and organizations and involves a spectrum of actors and stakeholders who have a vested interest in solving a social problem. Accordingly the collective creation process for social innovation is complex and can involve multiple public, private and third sector organizations.
Caulier-Grice, Davies, Patrick, Norman. (2012: p. 18)	Social innovations are new solutions (products, services, models, markets, processes etc.) that simultaneously meet a social need (more effectively than existing solutions) and lead to new or improved capabilities and relationships and better use of assets and resources. In other words, social innovations are both good for society and enhance society’s capacity to act.
Viñals (2013: p. 4)	Social innovation refers to a design and implementation process as well as a process of disseminating new social practices and policies. It encompasses innovations that are directly related to the search for solutions to society’s problems and challenges. These solutions often involve new form of communication and cooperation.

Cajaiba-Santana (2013: p.3)	The path of social innovation is not a social problem to be solved, but the social change it brings about. From this standing point, one can better perceive the specificity of the process of social innovation creation as new ideas manifested in social actions leading to social change and proposing new alternatives and new social practices for social groups. Social innovation is a collective creation of new legitimated social practices aiming at social change.
Hochgerner (2013)	Social innovation is the new combination of social practices

3 AIM

The literature debate has gained a momentum to open up social innovation to business and management issues (Ellis, 2010; Rubalcaba et al., 2013). However, there are few studies that specifically relate business innovation with social innovation from an integrated perspective.

Social innovation looks at social and behavioural changes where the perspective is still public-agent focused and non-profit oriented (Rubalcaba et al., 2012). While institutions and public organizations lead social innovation process companies still are seen as actors that can participate to this process (Pol and Ville, 2009).

Recently it has becomes more salient to question whether firms have power in the way that institutions have power (Painter-Morland, 2013). The business world is stated to become often influential in many parts of society, including in public and political decisions. However when governments adopt new policies and strategies in response to popular or special interests to change society, businesses are much more often attentive to responding to market opportunities circumstances and their own competitive performance.

This paper starts from a view of the company as part of a broader system of economic, social, cultural and technological influences. The importance of the various influences depends on the firm's ability to shape a new social-business innovation context. The issue concerns not simply the building up of a collaborative network of actors for the pursuit of the lead organization's main innovation goals. The organizations take the lead of the social and business changes when they are more proficient in interactively shaping and collaboratively developing values, standards and rules by joining the interest of different social, economic and institutional actors (Hans-Werner et al., 2012).

The understanding of how the interplay between social and business systems enable context for social-business innovation is crucial at a time scholars are trying to understand how promoting social change by integrating governments, markets, and private initiatives.

The objective of paper is to provide a first answer to how frame business and social innovation by an integrated perspective. More specifically we deal with the following questions: 1) What is social-business innovation; 2) What are the practices of social-business innovation.

4 Method

We focused our analysis on the for-benefit enterprises, as a richer context to understand the interplay between the business and social issues. The double soul of this kind of companies makes them interesting to be analysed in order to get insights into the social-business innovation, without having one issue overwhelms the other (i.e a business-oriented social innovation vs. a social-oriented business innovation) but a more equilibrated situation.

We investigated the community of B-Corporations, a new type of company that uses the power of business to solve social and environmental problems. Such corporations are certified by the non-profit organisation, B Lab, and meet rigorous standards of social and environmental performance, accountability and transparency. This community is growing daily and includes organisations from all over the world. The B-Corporation community is increasing at an impressive rate, growing from 450 at the end of 2011 to 1000 as of August 2014.

The following quote well depict the vision of B-Corporations:

B Corps create higher quality jobs and improve the quality of life in our communities. And, as the movement grows, it has become an increasingly powerful agent of change. We are passing laws. We are driving capital. Government and the non profit sector are necessary but insufficient to address society's greatest challenges. Business, the most powerful man-made force on the planet, must create value for society, not just shareholders. Systemic challenges require systemic solutions and the B Corp movement offers a concrete, market-based and scalable solution.As a result of our collective success, individuals and communities will enjoy greater economic opportunity, society will address its most challenging environmental problems, and more people will find fulfilment by bringing their whole selves to work ([http: www.bcorporation.net](http://www.bcorporation.net) accessed 30 July 2014).

We selected a sample of 50 B-Corporations through a research based on key words (social innovation and business innovation) on the B-Corporations' website. We investigated how companies frame social-business innovation and

develop innovative practices through multiple methods: netnography, interviews and seminars. The research adopted an emergent, flexible, abductive process, oscillating between theoretical insights and empirical work (Dubois and Gadde, 2002).

In accordance with netnography research, data include preliminary studies of the web-based context, naturalistic observations of the community and the activities of its members and direct interactions with the members of the innovating community (Kozinets, 2002).

The data were elaborated and analysed by setting up a two-phase investigation. First of all companies' documents and written interviews were analysed through a content analysis. As Weber notes (1990), content analysis classifies textual material reducing it to more relevant, manageable bits of data. The analysis began by identifying and quantifying certain words or *content* in documents to grasp their contextual use. Quantification was conducted to explore usage and not to infer meaning, as advised by Hsieh and Shannon (2005). However, the analysis was not only limited to measuring the frequency of specific words or content (i.e., manifest content), but it also included a summative approach (Hsieh and Shannon, 2005) to *discover* underlying meanings of the words or the content and used quotations to illustrate issues and phenomena revealed by the investigation (i.e. latent content).

In the second step, we wrote a case report for each company. We carried out an intra-case and cross-case analysis in order to understand similarities and differences in the companies' approaches to social-business innovation.

Finally we discuss final framework and the paper with some senior managers from one B-Corporation. This procedure is a good example of a "member check" procedure (Lincoln and Guba, 1985). Taking such steps increases the quality (i.e., the construct validity) of a study. Concerning the generalizability of the results, we followed the advices by Halinen and Törnroos (2005) and Järvensivu and Törnroos (2010), our research was not used to generate theories, but instead to obtain new insights and to generate a local and context-specific understanding of social-business innovation.

5 Findings

5.1 Social-business innovation and value propositions

For B-Corporations social innovation is more than a social issue related to the narrowed interest of poor people. The new value propositions emerge from the business strategies, practices and values that meet the social needs (the what) and improves the society (for What). Both of these aspects are identified according to the wider integrated perspective of business and social.

Regarding the "what" of their innovative strategy, the core of social innovations is how enabling users to change their behaviour and improve the quality of their lives by maintaining a healthier living environment. Coherently B-Corporations define innovative value propositions that articulate social, environmental, life quality, well being themes and that produce direct or indirect effects. In many cases the example of a direct improvement in the quality of life is an innovation that increases well-being immediately, such as through the provision of new healthy, educational or consultancy services. In other cases the improvement is provided to encourage users towards products or services with less environmental impact. These innovations contribute indirectly and in the longer term to people's quality of life by encouraging social and sustainability behaviours.

"The company conducts business on a Triple Bottom Line model, indeed it makes measuring success by the social, environmental, and economic impacts. We provide a compelling and self-powered experience to users capable of improve quality of their life by maintaining healthier living environment. By delivering solar energy solutions to homes and businesses, its activities are slowing the destructive effects of climate change. And at the same time, its customers are gaining energy independence while supporting a local, green economy. This can be seen as a win-win-win, with the results being a cleaner, safer planet, increased energy independence, and a robust local economy" (B-Corp N.37).

"The company regards water as an essential, long-term environmental and community asset: their systems are designed to preserve the quality and quantity of available freshwater supplies and they manage water so that communities can reclaim its nutrients, biomass, heat, and non-potable supply as part of a complete sustainable systems approach to water, energy, and land management" (B-Corp N.22).

Regarding the "for what" the solutions the B corporations propose for societal challenge include new value propositions able to impact on people, society and organizations as well. The following quotes depict how all these aspects have to be considered at whole:

"Many businesses are interested in increasing brand value, improving employee satisfaction, and saving money, through "going responsibility." This initial interest, however, is often stymied by conflicting priorities, confusion about next steps, or the lack of a clear value proposition that directly links increased social and environmental responsibility with tangible business outcomes" (B-Corp N.3.)

“The reason why of social innovation is linked to the capacity to balance the search for a social justice with a healthy environment with a vibrant economy. Social innovations will only have an impact on society if they bring about changes of behaviour and create long-term value for all” (B-Corp N.6).

“Designing meaningful innovations that create value for users, organizations, and society requires a holistic view to integrate seemingly conflicting needs and requirements into compelling solutions” (B-Corp N.19.)

The “change we seek” framework (see Fig. 1) shows how B-Corporations articulate the meaningful innovations that combine “creating ‘something good for the users, ‘doing well’ for the organization, ‘doing good’ for the total community and creating an impact at societal level (source: B-Corporations’ document).



Figure 1. “The change we seek”.

Four main pillars structure the areas of influence that B-Corporations’ innovation strives to improve: Community, Workers, Environment and Governance.

Emerging value for the community is revealed in sentences that not only report the word “community” as the most cited but also includes phrases like “we”..., “for others”, “better for all”, “for our partners”. In addition to ensure that the change pursued goes beyond the immediacy of the market transactions, the opportunities for value creation are enhanced in visualizing tangible and intangible benefits across local, supply chain and organisational context.

Value and relationship development with community, workers and business partners are highly integrated. A wide dialogue with all these parts forms the basis of the B corps value proposition (see Table 2). They are crafted to include anything that is necessary to perform the intended social function. So an explicitly recall is devoted to all economic and social actors that are required to develop a coherent social-facing solution collaboratively.

Table 2. The four pillars of Social-Business Innovation.

Community	Provide local communities with great opportunities Make responsibility conditions for the entire business Assure equal and fair relationships to small local producers
Worker	Improve economic social and psychological conditions of employees Provide a vehicle for worker to develop and achieve their personal and professional aspirations
Environment	Changing how people view their role in creating a sustainable future
Governance	Pursue financial stability by providing sustainable value delivery for all Assure long-term financial health to invest in employees customer and community

B-Corporations measure the impact of their innovation on local communities to be provided with information, practices and other supports for their betterment. Similarly they work to create responsible conditions for the whole ecosystem including suppliers, distributors, small local firms and other partners. Also the employees are considered key actors in B-Corporations social innovation strategy. The changes in work conditions provide employees with opportunities that increase job satisfaction and guide them in their contributions to social value. And finally social innovations promote

the resource effectiveness both in the sense of greener and environmental results that in the financial aspects. Having invested in the new value propositions with the expectation that investment will grow in value not only is in the B-Corporations' legit object but it also assures the financial health to invest in the larger community.

"I saw many impressive no-profits doing good work, but they seemed challenged to reach scale," he recalled, noting the need, especially in the beginning, to invest "significant" amounts in his company's mission. "It was only when my company grew, and I began to reinvest my earnings in coffee communities abroad, that I saw I could really make a difference." I felt that a no-profit business model would have slowed down his progress. He wouldn't have been able to bring together growers (farmers overseas) and roasters (businesses usually based in the United States) without a profit motive for both" (B-Corp N.15).

In sum, the enrichment of value proposition across the four pillars enables the balancing of value across the different parties and ensures the creation of social-business value: it is the value created in better connecting social-environment and business issues and that overcomes the idea of simple 'economic welfare'.

5.2 Practices of social-business innovation

B-Corporations develop innovative value proposition through three practices that are peculiar ways of doing social-business innovation: 1) engaging, 2) promoting, and 3) institutionalizing.

5.2.1 The practice of engaging

B-Corporations recognize that pursuing social-business innovation is not a sole-actor endeavour, but it requires the engagement of multiple actors to whom the innovation can affect. The practice of engaging multiple actors, such as companies, consumers, users, institutions, public organizations and others, allows having access to a higher variety of resources enriching the resource integration process and increasing value co-creation. The following quotes illustrate this issue:

"The initiative of 'Green Your Challenges' is the idea that leverages the powerful concept of "gaming for good" to engage members online in a fun, educational environment while influencing eco-friendly behaviours offline" (B-Corp N.5)

"The Hub LA is the first membership club structured for impact professionals in Los Angeles. It looks to serve as a catalyst for members to further their positive impact in the world and reinforce their social entrepreneurial missions. The Hub LA is not just focused on startups nor does it refer to itself as a co-working space; what it offers is much more curated, thoughtful and mission-driven. The Hub LA hosts members, facilitates collaboration and introductions, and produces programs and formats in which members engage" (B-Corp N.5).

"M. Consulting develops innovative solutions to social problems through social entrepreneurship projects. FUTURE IS BRIGHTER is a social entrepreneurship project developed by the Mikado Team. The Future is Brighter is a development project that brings together those who need knowledge and those who have knowledge via innovative and interactive methods. The project creates synergy among educational institutions, private sector companies and NGOs and thus creates multi- dimensional social benefit. Making experience and knowledge sharing possible via innovative methods. The aims of the project are: • Creating synergy among educational institutions, private sector and NGOs ; • Being a personal and professional development channel ; • Founding a network of thousands of youngsters • Encouraging employee volunteering" (B-Corp N.25).

"As nonprofit organizations face lack of resources and an increasingly complex world today, many foundations need to work together in order to share their knowledge, their skills and to address their needs and issues in our communities. Company's expertise in planning and meeting facilitation can help ensure that foundations will work together and become a truly effective partner in a mutually beneficial relationship with each other and the community" " (B-Corp N.40).

The engaging practice emerges through the tuning of actors' values and behaviours toward collective efforts. B-Corporations develop initiatives of social networking to build their communities. The aim is to strengthen the actors' ties within the ecosystem by developing working communities, whereas the social-business innovation develops as a collective effort- .

"The RIA (Red de Innovación y Aprendizaje) or Learning and Innovation Network, is a network of 70 education and technology centers located in underserved communities in the State of Mexico, providing access to information technologies and quality educational opportunities.! The model is composed of four parts: Access to robust IT infrastructure; Selection and development of relevant educational content for all ages; A blended

learning model with skilled facilitators and educational software; and Analysis of each student's performance to revise and improve course content" (B-Corp N.1).

"By developing social innovation process the company's goal is to inspire smarter choices for a more sustainable future. We believe that individual actions, such as increasing recycling or learning about greener ways to purchase, consume or dispose of products, can add up to a big impact for our planet! So we realize a lot of social-networking and real-world actions" (B-Corp N.2).

"The company offers a facilitated approach to stakeholder meetings that gives all participant groups the opportunity to contribute to planning the meeting, assures relevant, engaging, and goal oriented agenda sessions, and leaves both the organization and participating stakeholders with memorable and recognizable results from the meeting" (B-Corp N.26).

5.2.2 The practice of promoting change

B-Corporations do not develop new goods and new services as the end outcome to increase profit and competitive positions. New goods are appliances to new service provision (i.e. the real innovation) able to enable value co-creation for the involved stakeholders. Benefits to community and the whole ecosystem guide the innovation process. In this perspective the core of social-business innovation is to promote a change in values and behaviours. 'The change we seek' slogan becomes a value shaping companies' way of thinking and doing. At the same time it is a value to be spread out to the communities.

"Through the Integrated Objectives Model (IOM) the industry is mobilized, attracting capital and investment and involving other parties in the pursuit of poverty relief, and at the same time, empowering its own corporate and industrial objectives (high economic return concurring with high environmental and social returns). We believe in a new way to conduct business in which social and economic profitability work together. We are more than a company; we aim to create a wave of technological innovation to overcome poverty.

The Change We Seek®: AIC has mobilized industry, attracting capital and investment and involving other parties in the pursuit of poverty relief, and at the same time, empowering its own corporate and industrial objectives (high economic return concurring with high environmental and social returns)" ((B-Corp N.48).

The practice of promoting change emerges through specific activities such as educating, teaching, supporting and empowering and planning. The common *leit motiv* is to make the challenges happen and modify the status quo. They serve to open up opportunities for a wide range of actors to become collaborative change agents in transformations for social.

In this sense B-Corporations work as the engine of the social-business ecosystem, as they symbolize the spark leading to the beginning of all other actors' efforts towards sustainability

"The digital divide in Mexico is significant with 69% of the population, or 86 million people, lacking access to computers or the Internet. Mexico's education system has the lowest performance in the Program for International Student Assessment (PISA) among OECD members despite the fact that 25% of public spending goes towards education. Company's innovation projects aim to create education technology solutions to drive down the digital and educational gap in low-income communities in Mexico" (B-Corp N.1).

"HUMAN is a one-of-a-kind nutritional distribution platform that develops healthy vending machines, healthy micro markets (unattended self-checkout convenience stores), and direct delivery services to bring convenient, healthier, and better-for-you foods and drinks to people". The company's name is an acronym standing for "Helping Unite Mankind And Nutrition". HUMAN has innovated a new model for "instant" nutrition placing its machines in over 1200 schools, hospitals and other locations across North America. The core of their business is to solve social and environmental problems expressed in their mission: "make healthy food more convenient than junk food". Along with its innovative offering HUMAN promotes improved nutrition and entrepreneurial education in underserved schools and to fight childhood obesity via their charity, HUMAN Everywhere (B-Corp N.10).

"Strategic Sustainability Consulting's innovation projects provide sustainability knowledge to under-resourced organizations that want to 'go green'. We believe that, before you spend significant time or money on specific "green" initiatives, it is important to understand how sustainability influences your business model, your value chain, and your products and services" (B-Corp N.6).

"ThinkImpact is a social enterprise with offices in Ghana, Kenya, Rwanda and South Africa. Through their global experiential education programs they help people start something meaningful. ThinkImpact offers offline and online programs, for students, universities and companies in order to power experiential education

programs that catalyze social innovation and entrepreneurship. Social Innovations are designed to leverage local resources – rather than offer traditional aid – building market opportunities, creating jobs, and connecting people through collaboration. By focusing on opportunities and empowering individuals to start something, they envision inspiring microenterprises that sell products and services that improve lives, creating critical new jobs along the way” (B-Corp N.30).

“Upcycling offers sustainable solutions that help people reduce their waste stream and environmental impact. We seek to help solve the problem of waste by teaching people how Upcycling or re-purposing will close the recycling loop and lessen dependence on virgin and non-replenish able resources” (B-Corp N.22).

5.2.3 The practice of institutionalizing

Although B-Corporations promote changes and challenge the status quo through continuous improvement, they also work to institutionalize social-business innovation or what can be defined as their ‘breaking free from traditional management’ both in terms of language, actions and performances. The practice of institutionalizing new values, norms and behaviours enable the emerging of a new social-business ecosystem (i.e. the one of B-Corporations).

“Ethics and integrity are at the core of our work at ThinkImpact; when we say we “Think Impact” we are expressing a worldview. We believe in the power of business to make positive impact in the world but only when the highest ethical standards are in the corporate DNA. We chose to become a B Corp because it provided a powerful tool to benchmark our work and to learn new ways to improve our company while adding transparency to our operation “(B-Corp N.30).

The first keystone of institutionalization is the certification. The certificate helps the consumers to identify companies promoting the change as well as investors to have profits without sacrificing the welfare of society, even helping to make a difference.

“We became a B Corp because we fervently want to change the world. With our expertise in marketing and communication, we want to work with companies and organizations who are actively engaged in making the world a better place. Our B Corp certification not only tells the world what we believe but also provides opportunities to challenge other businesses to operate in a new way” (B-Corp N.9).

“The C-Level Management has been developing the ‘Socially Conscious DNA^ for a number of organizations. The mission is to teach organization how they can create a sustainable giving program within their organization that restructures the DNA of the culture through a complete brand infusion of their guiding principles. The company has also developed a strategic partner ecosystem able to offer a complete set of solutions for business problems. The fundamental goal of C-Level is to recruit social conscious employees, partners, and customers that are working together to significantly affect the way companies support their community” (B-Corp N.39).

The second keystone is the process of B Corporation Assessment. All B-Corporations measure indeed their impact and achieve at least 80 points on the B Impact Assessment to validate that they have achieved a significant threshold of impact. They also expand their corporate duties to include the consideration of the interests of all stakeholders, not just shareholders. B Corps are typically focused on improving and sustaining their impact over time and generating profit simultaneously.

“We envision that in a generation's time, all businesses will measure and manage their impact as readily as they do profitability. We manage what we measure. This is one of the most basic truths in business. It follows that we ought to measure what matters most: the ability of a business to not only generate returns, but also to create value for its customers, employees, community, and the environment”. (<http://bimpactassessment.net>. Accessed 30 June 2014).

The B-Lab provides standards, benchmarks and tools to enable the assessment by B Corporations. The process follows three steps:

- 1) assess how the company performs against a lot of best practices on employee, community, and environmental impact.
- 2) compare company’s impact and see how company stacks up against other businesses.
- 3) improve company’s impact by developing a plan to improve company’s practices, and help company’s staff to implement them easily with B Corps’ Best Practice Guides and Examples.

This process of assessment allows improving practices and focuses on higher impact projects of social-business innovation.

“The Assessment gave us a sense of what practices to prioritize over others. Before, we were doing a lot of offsets for our operations, and the Assessment forced us to ask harder questions about the carbon in our supply chain or about making our warehouse more energy efficient. So it helped our money go much further by just asking us the tough questions” (B-Corp N. 11).

“The B Impact Assessment incentivized us to take the time to quantitatively measure the performance of our programs. For example, we provide several opportunities for employees to participate in environmental or social activism. But we didn't know how many employees participated and to what degree. But this Assessment asked us those tough questions, and we took the time to measure and manage the participation and outcomes of these programs. This has given us a better understanding of which ones are most effective and which ones could be made more robust. Because the Assessment gathers all of this information in one place, it allowed us to really recognize our strengths as well as see where we have room for improvement” (B-Corp N.50).

In sum, this process of assessment allows to share values and practices shaping a new service ecosystem based on the joint creation of social-business value. It not only offers answers but it is a tool to rise up questions.

“We entered the Assessment with the notion that we had a tremendous impact as a corporate citizen. The Assessment revealed to us that we were engaged in many positive practices but that there was much room for improvement in almost every area we were being scored on. First, we needed to take a look at our suppliers. What were their practices and did their practices reflect our values?” (B-Corp N.21).

“As a company who thought they were a very socially-conscious business, however we found that our initial score was well below the threshold for a certified B-Corp. The Assessment process was very educational as it gave us strong inspiration and some concrete ideas to act upon. There are many practices we were unaware of that the Assessment opened our eyes to. We began to ask ourselves: how to implement our values into formal practices” (B-Corp N.16).

6 Discussion

This study focuses on social-business innovation as a new integrated approach to address the complexity of the social issue social as well as the business endeavour. By moving beyond the mainstream research of both social and business innovation, the authors questioned on how framing social-business innovation from an integrated perspective.

This main research question led empirical study and theoretical contribution under two main questions.

The first question was: What social-business innovation is?

The B-Corporations' innovation model provides a suitable evidence of how organisations accomplish social and business aims. B-Corporations overcome the traditional boundaries distinguishing among social and business companies by integrating societal, ecological and economic impacts into their innovation strategies. B-Corporations' social-business innovation deals with the challenge of trying to simultaneously manage social, environmental and business performances by offering an appealing value proposition behind that there is the idea of making money by doing better. Their role differently from social enterprise is not to serve as an enabler for the poor but they contribute to create the overall value for society from being part of and contributing to create something larger or more permanent. In doing so such companies provide evidence and arguments for a new perspective on social innovation that challenges the traditional weakness of social business (Westley and Antadze 2010). The concepts of success and the health of the innovation are intrinsically linked to an integrated perspective taking a multiple actors-centred focus of value creations. The four pillars (i.e. Community, Workers, Environment and Governance) of social-business innovation model of B-Corporations appears as an highly integrated approach based on concepts of socio-cultural impact as the starting point of innovation-solution, and involving all actors that are deemed relevant to accomplish social aim as well as business interest.

Social-business innovation deals mainly with providing tangible and intangible multiple benefits towards several actors (Figure 2). Value co-creation and relationship development with community, workers, business partners and society are highly integrated. A wide dialogue with all these parts forms the basis of the value proposition in terms of social-business innovation. The value co-creation emerges as an A2A and many to many patterns.

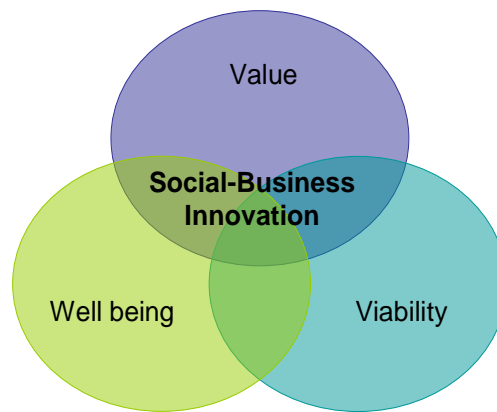


Figure 2. Social-business innovation: value, well-being and viability.

The phenomenon seems to be complex and multi-layered. By adopting a wider perspective on value, we address that social-business innovation enables the co-creation of well-being (Rosenbaum et al., 2011; Anderson et al., 2013). Well-being is a multi-dimensional construct (Stiglitz, Sen, & Fitoussi 2009) closely related to quality of life concept:

An individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, personal beliefs, social relationships and their relationship to salient features of their environment (World Health Organization, 1997).

The elements that are defined as “well-being outcomes” – happiness, health, decreasing disparity, access, literacy - represent value that B-Corporations aim to reach by considering not only individual but collective level of benefits. By addressing co-creation of value and well-being, the viability of the service ecosystem increases (Wieland, Polese, Vargo and Lusch, 2012).

Close to the first, the second question was: What are the practices of social-business innovation?

Social-business innovation is not simply a new solution (goods or services) but a service provision of multiple benefits for several actors. It is thus an enabler of value, well-being and viability (Rubalcaba et al 2013). In this perspective B-Corporations' social innovation model provides evidence of a different way of thinking and acting about problems or opportunities: a process involving reflections with various stakeholders not only on what to do but also on how to do.

B-Corporations develop innovative value propositions through three practices that are peculiar ways of doing social-business innovation (figure 3): 1) engaging, 2) promoting, and 3) institutionalizing. The practice of engaging emerges when B-Corporations involve multiple actors, such as companies, consumers, users, institutions, public organizations and others, to have the availability of a wider variety of resources as well as to enable social-business innovation not as a sole-actor endeavour but as a collective accomplishment. Social-business innovation initiatives start with an ill-defined problem. Through continuous knowledge exchange, insights are enhanced and new knowledge gaps are identified; this causes the need to invite new actors to contribute along the way. The engagement of multiple actors to whom the innovation can affect is necessary to stimulate a change in the way of thinking and behaving. The practice of promoting a change requires several actions as educating, teaching, supporting and empowering and planning. All these actions challenge the status quo but at the same time support a practice of institutionalizing where new values, norms and behaviours are set. The institutionalization enables the emergence as well as supports the viability of service ecosystem.

Social-business innovation requires a variety of actors, working in concert with the agent starting the innovative project. In line with Caulker-Grice et al (2012), Hochgerner (2013) and Rubalcaba et al. (2013) the study emphasises that social innovations more than the proposal of new product or new services can be seen as a proposal of changing practices.

All together the three practices depict the way of doing of B-Corporations social-business innovation whereas a simultaneously impact is created on consumer and business conduct, social norms, institutional structures laws and routines which govern and enable social innovation to flourish. The emphasis is more on the importance of coordinated goal-oriented multiple actions via emergence of practices that facilitate social sense-making and create a support to sustain and institutionalise social transformation.

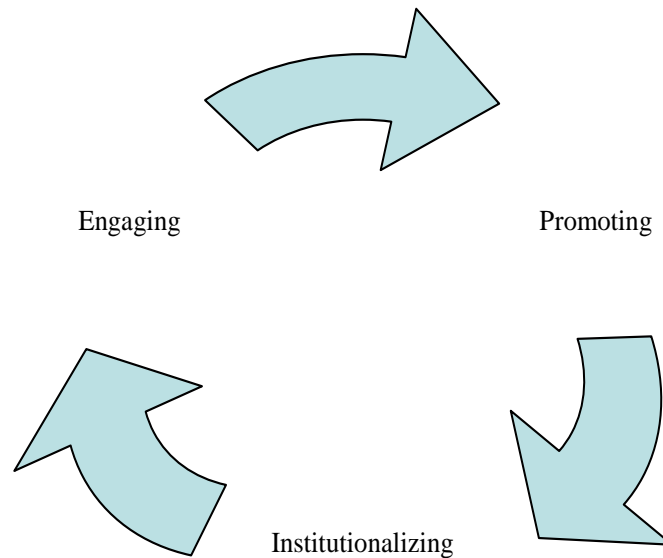


Figure 3. Practices of social-business innovation.

7 Implications and further research

This work gives a framing of social-business innovation as an integrated concept and does not support the idea of social *and* business as two separated issues able to be joined according the contextual and occasional opportunities.

Specific implications for managers and scholars can be drawn.

Concerning the practitioner side, this study suggests that managers should frame innovation according a joint perspective between the social and business issues, without having one issue overwhelms the other (i.e. a business-oriented social innovation vs. a social-oriented business innovation) but adopting a more equilibrated approach. Second the process of deployment new value propositions should take into consideration the multiple benefits according to the several actors to whom the innovation can affect or be affected. Third a practice-based approach can be adopted to recognize the role of actors, actions, resources and institutions in enabling social-business innovation. This approach seems appropriate to understand social-business innovation, as it looks at how different actors face ill-defined problems and interact to integrate desirability, feasibility and viability in new ways of doing.

Some scholars argue for the need to improve understanding and implementation of social innovations by joining the business and social perspectives (Rubalcaba et al., 2012). Business innovations as well as social innovations show some point of contacts in their literature evolution: both are collaborative in nature and interactively processes: ventures whose success relies on the involvement of many stakeholders outside corporate boundaries. However joining the two perspectives requires studying the concurrent, interdependent and dynamic process going on: defining both new value propositions for customer and for network of stakeholders that combine their resources into a coherent solution aimed to respond to both business and social needs.

The results of this study suggest several avenues for further exploration. First, additional case studies investigating the study's findings would help determine whether there is even stronger empirical evidence supporting the new perspective. Second, if social innovation increasingly evolves towards involving challenges at economic, social and institutional system more investigation is needed to unravel the mechanisms enabling firms to converge towards common social-economic aims and stabilized relationships with institutions and other public- private actors in a new social-business innovation context.

Additional questions could be formulated to provide more generalizable evidence on the new perspective and paradox resolution in the successful management of social, environmental and financial goals.

How do firm frame value proposition in a way that it must resonate with broader stakeholder's issues? How do firms promote incentives in the different businesses to support behaviours' changes? How do the new institutions (values, rules) that firms contribute to create could be harmonised with different policies and strategies?

Furthermore it is interesting to analyse the process of value co-creation as complex and multi-layered (Chandler and Vargo, 2011). Moving beyond the single dyad the A2A perspective within a service ecosystem view (Mele et al. 2014) seems to offer a useful approach to frame the social-business innovation.

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Services system evolution in the EU: An agent based modeling approach

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The objectives of this synergetic reasearch between Informatics and Economics are defining a holistic perspective of the EU system and creating an agent based model (ABM) for testing different policies. The paper comprises a short literature review, a presentation of the NetLogo ABM along with the real data database used, the simulated scenarios, their corresponding results and interpretation. Thus, even if a technical one, the model reveals different types of unexpected innovations that can offer solutions or may themselves be solutions to some societal challenges like ageing population, environmental problems, labor market issues et cetera.

Keywords: agent based models, service system, economic policies, EU evolution

1 Introduction

In today's economy, we speak mostly of regions than of countries, at least on the European Union's territory. Therefore, even if the territorial point of view is changing the economic expectations remain the same: how much will that country or region grow and develop over time. One of the problems here is the fact that when we measure the growth of a country, region or union like the EU, we tend to do that separately, but a recent research proves us tha we should not do it like this, but we should do the opposite (Ciutacu, I., Savulescu, I., Dumitrascu, LM., 2012).

As a draft concept, a system first appears in Greek philosophy. Stating that "a whole is more than the sum of its components", Aristotle provides a first definition for the notion of system that will develop and evolve in time, only reaching its current form at the beginning of our century (Stoica, Maricica, 2001). Some hundrets of years later, in 1950, Ludwig von Bertalanffy founded the theory of systems. From his perspective, a system can be defined as a reunion of interacting/interdependent elements, acting for the achievement of a shared goal, by using a complex of material, energy, financial, informative and human resources (Bertalanffy, L, 1968).

The concept of system is frequently used in various fields of economy, technology, nature and society. Thus, we can find business, information, biology, education, production, social systems, etc. Their shared feature is the relatively high number of components that come to interact with the environment with a view to achieving an objective that may be a law of nature or a man-made objective, as happens with the services system of the EU, which is a complex system.

A good solution to studying the different types of systems mentioned above can be the use of ABMs, because these are computerised simulations of artificial worlds with structures as diverse and complete as needed, in which different types of agents interact by using predefined rules. Also, ABM allow their agents to behave according to learnings of past experiences and to their current situation, and in this way an ABM can handle the nonlinear behaviour of a complex system in a wider range than previous conventional models can. Like this, ABM allow policy makers to simulate and explore quantitative and qualitative consequences of different policy scenarios upon artificial economy models that can be built as a simplified model of a real one (Ciutacu, I, 2012).

2 Literature review

2.1 About systems theory

According to some authors, a system is any section of reality where a complex of phenomena, objects, processes, finite concepts or mutually interconnected groups can be identified, jointly and orderly operating with a view to achieving well defined, pre-established and planned objectives. This definition of a system includes three essential elements: a purpose (objective) motivating the conception and existence of a system; a certain organization (order) of its elements; the supply of information, energy and materials to components, for the proper achievement of goals.

The multitude of relations between the components of a system, as well as the relations between the components and the whole build the structure of the system, while the multitude of the system's features at a given moment determines its state.

Any system is an integrated whole of its components and only appears when a range of elements begin to mutually interact.

Any system's purpose is accomplished through the achievement of its goals. Ideal goals are the easiest to identify in system analysis. Generally, in complex economic systems, objectives are not clear, as happens with the services system in the EU.

When analyzing objectives, alternatives or unwanted consequences should also be taken into account. Usually, economic systems do not aim at a single objective, but at a wide range of objectives. Therefore, several issues arise regarding such objectives:

- their hierarchical structure;
- their aggregation or decomposition;
- how to achieve them;
- establishing any disturbing factors likely to affect objectives;
- ordering objectives based on certain criteria;
- establishing the performance measures assessing such criteria;
- assessing the consequences of objectives and re-assessing them, if applicable.

In the case of **complex economic systems** (such as the services system of the EU or the economies of certain countries) including a wide range of subsystems, objectives should be organized in a hierarchical structure, considering the priorities, the internal structure of the system and the environmental impact. When establishing the objectives of the subsystem, both the internal and external objectives of the system should be set. Decision makers are influenced by equivalent factors in the connected systems they cooperate with, that may result in changes to the objectives. All this makes sense and can be easily managed by means of the NetLogo software.

With a view to reflecting the complexity of this system, as well as having relevant results, we have used agent-based models in the NetLogo software, as you will see in the applied part of this article.

2.2 About ABMs and NetLogo

ABMs are already successfully used in simulating situations and helping policy-makers create and implement policies in different scientific and/or real domains like: Epidemiology, Demographics, Economics et cetera. In Economics, probably the biggest agent-based model is the EURACE project that models the European economy (Lengnick, M, 2011).

ABM can be designed and created by using various computer programs and can be run on computers on a range that goes from the simple PCs to the very powerful computers. Some of these programs are: Repast, R, NetLogo and various more. In this research we used NetLogo which was designed by Ury Wilensky in 1999 and developed ever since at The Center for Connected Learning and Computer-Based Modeling of the Northwestern University. This ABM developing program runs as a standalone application on the Java virtual machine of computers that use Mackintosh, Windows, Linux or various other platforms.

NetLogo allows its users to create an artificial 2D or 3D world and explore the connection between the micro-level behavior of individuals and the macro-level patterns that emerge from their interactions. By using a special programming language (derived from the Logo programming language) users can predefine rules and instructions for the four types of NetLogo entities: turtles, patches, links and the observer. Patches are immobile agents that give the artificial world its form (quadrilater, cylinder or thorus), turtles are mobile agents that can change their position in the world, links connect two or more turtles and help the modeler to set different generations of turtles (a directed link creates a parent-child relationship), while the observer helps the designer see better the world he creates. The time in the NetLogo ABMs can be measured either in ticks (the time a turtle needs to go from a patch to one that is next to it) or in seconds.

3 The model

3.1 The NetLogo world (description):

- The shape of the NetLogo world is a rectangle of 30 per 30 patches, with 1 patch having 9 pixels.
- The time of this world is calculated in ticks (the time a turtle needs to move from one patch to one of those next to it) and we will consider that a tick is equal to a year in human time.
- The mobile agents in this world (turtles) are the following the EU (turtle 1), the 28 countries that the EU is made of, the populations of these countries, the products the EU citizens produce. The order of the numbering of the turtles is that from the table below.
- The currency of this world is “value”, each country’s currency is calculated by multiplying 1 value to its Implied PPP conversion rate in the table below. We chose this method that uses the exchange rate with the current international dollar, rather than using the euro, because in this way we have both an exchange rate and a value for the purchasing power in that country.
- The EU from our model has the same 28 countries (Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, Poland, Portugal, Romania, Slovenia, Slovakia, Spain, Sweden, The Netherlands, The United Kingdom) that the real EU has.
- Each country in the model has a population number equal to the one (without the millions) in the table below that has the data for the population and for the unemployment rate in each EU country.
- We suppose that the entire population of each EU country is employed in a random percentage either in farming, in industry or in the service sector. This percentages are the same in the entire EU.

Table 1. EU data.

No.	Country	Population (million persons)	Unemployment (% of total labor force)	Implied PPP conversion rate (national currency per current international dollar)
1	Austria	8.45	4.2	0.87
2	Belgium	11.02	7.23	0.90
3	Cyprus	0.83	7.78	0.76
4	Estonia	1.34	12.48	0.60
5	Finland	5.43	7.78	0.98
6	France	63.37	9.68	0.91
7	Germany	81.61	5.98	0.84
8	Greece	11.20	17.31	0.73
9	Ireland	4.57	14.39	0.86
10	Italy	60.90	8.37	0.86
11	Luxembourg	0.52	6.04	1.02
12	Malta	0.43	6.40	0.6
13	Netherlands	16.77	4.50	0.86
14	Portugal	10.68	12.74	0.69
15	Slovak Republic	5.42	13.40	0.55
16	Slovenia	2.02	8.08	0.61
17	Spain	46.36	21.64	0.76
18	Bulgaria	7.36	12.46	0.75
19	Croatia	4.42	13.25	4.45
20	Hungary	9.96	10.95	151.58
21	Latvia	2.22	15.63	0.41
22	Lithuania	3.25	15.50	1.81
23	Poland	37.64	9.65	2.04
24	Romania	21.38	7.21	2.31
25	Serbia	7.43	23.65	45.39
26	Denmark	5.58*	7.0*	1**
27	The United Kingdom	63.70*	7.9*	0.5**
28	Sweden	9.52*	8.0*	1**

Source: IMF, Eurostat (*), authors' estimation (**)

3.2 EU country agents' characteristics in NetLogo:

- There are 28 agents, one for every country in the EU.
- Each country is shaped as a circle, has a size of 3 patches and a label with its name. The EU country agent is immobile in the NetLogo world and has a specific color calculated after its order in the table above. The EU agent's shape is a circle as well with the size 4 (patches) and with the color blue.
- Each country has incomes and expenditures. Its incomes are made of the sum of the values of the products its population produce and the incomes the EU distributes to it. Its expenditures are made of the sum of the money it sends to the EU and of the salaries it pays to its population for the goods they produce either in farming, in industry or in the service sector.
- All the countries have no differentiation between its farming, industry and services sectors.
- Each country is connected to its population and to the products that its population produces by links. Thus the EU country agent knows when a new product has been made, when a product was sold and when one of its citizens must be paid for its work.

- Each country is connected to the EU agent by links, thus each country contributes to the EU budget with a randomly chosen percentage of its incomes and receives as well, a random percentage of what the EU has gathered at the end of the time period (a tick).
- When a country receives a product from one of its citizens it pays it 1 unit of value. And it receives 1.1 units of value.

3.3 Population (EU citizens' agents):

- The population of each country can be recognized after the colors of the EU citizens that are the same of the country's they belong to.
- The number of the population is fixed during the run.
- These are the only agents in the model that can move, thus giving this world its dynamics.
- If the agent is employed in farming its shape is "person farmer", if it is employed in industry its shape is "person construction", if it is employed in services its shape is "person service" and if it is unemployed is "person".
- A part of each country's population is employed in agriculture, industry and services. The percentages for these distributions are chosen randomly.
- Each EU citizen can make its own product for which the country that employs it pays it a salary. Thus, regardless of the country, farmers produce "apples", workers produce "bottles" and the EU citizens that are employed in the service sector produce "boxes". For each product it produces the EU citizen receives 1 unit of value. The products are disposed randomly in the NetLogo world and the change to produce something is as well random and happens if "random 10 <= 5".
- For every step an EU citizen makes (these are the only turtle agents that can move) it loses 0.1 units of value and when it encounters a product, it consumes it and receives for it 0.9 units of value.
- When an EU citizen remains without any value units it remains immobile unless a product is produced where it stands and it can consume it.

3.4 Scenarios:

In this model our aim is to see what happens with the wealth (the number of value units) of the entire EU and with that of the EU members if:

- a) The incomes of the EU are distributed to the EU country members proportionally to each country's by the number of population it has.
- b) The incomes of the EU are distributed in a higher percentage to the countries that have a number of population employed in the services sector higher than the EU average.
- c) The incomes of the EU are distributed in a higher percentage to the countries that have a number of population employed in the farming sector higher than the EU average.
- d) The incomes of the EU are distributed in a higher percentage to the countries that have a number of population employed in the industry sector higher than the EU average.

All these scenarios will be run for 5, 25 and 50 ticks.

4 Results:

Scenario a) The incomes of the EU are distributed to the EU country members proportionally to each country's by the number of population it has.

After we ran the first scenario for **5 ticks** the results were the following: the wealth of the EU was similar to the one it had after the first tick and the same happened to the most of the EU countries.

After we ran the first scenario for **25 ticks** the results showed that the wealth of the EU was with 31% smaller and that the countries that had a smaller number of citizens were beginning to lose their wealth.

At the end of the **50 ticks** of the first scenario, the results implied that the wealth of the EU was with 40% smaller, while the countries that had a few or 1 citizen were almost bankrupt.

Scenario b) The incomes of the EU are distributed in a higher percentage to the countries that have a number of population employed in the services sector higher than the EU average.

After we ran the second scenario for **5 ticks** the results were the following: the wealth of the EU was, as well, similar to the one it had after the first tick and the same happened to the most of the EU countries.

After we ran the second scenario for **25 ticks** the results showed that the wealth of the EU was with 25% smaller and that the countries that had a smaller number of citizens employed in the services sector lost about 50% of their initial wealth.

At the end of the **50 ticks** of the second scenario, the results implied that the wealth of the EU was with 30% smaller, while the countries that had 1 or more citizens employed in the services sector had had a walth increase of 33%, while those with no such employes were almost bankrupt.

Scenario c) The incomes of the EU are distributed in a higher percentage to the countries that have a number of population employed in the farming sector higher than the EU average.

After we ran the third scenario for **5 ticks** the results were the following: the wealth of the EU was, as well, similar to the one it had after the first tick and the same happened to the the EU countries that had citizens employed in the farming sector, the other countries were losing wealth.

After we ran the third scenario for **25 ticks** the results showed that the wealth of the EU was with 22% smaller and that the countries that had a smaller number of citizens employed in the farming sector or none lost from 30 to 38% of their initial wealth.

At the end of the **50 ticks** of the third scenario, the results implied that the wealth of the EU was with 25% smaller, while the countries that had 1 or more citizens employed in the farming sector had a wealth increase of 35%, while those with no such employees were as well as in the other scenarios, almost bankrupt.

Scenario d) The incomes of the EU are distributed in a higher percentage to the countries that have a number of population employed in the industry sector higher than the EU average.

After we ran the fourth scenario for **5 ticks** the results were the following: the wealth of the EU was as well similar to the one it had after the first tick and the same happened to the most of the EU countries.

After we ran the fourth scenario for **25 ticks** the results showed that the wealth of the EU was with 37% smaller and that the countries that had a small number of citizens employed in the industry sector were starting to lose their wealth.

At the end of the **50 ticks** of the first scenario, the results implied that the wealth of the EU was with 42% smaller, while the countries that had a a few or 1 citizen employed in the industry sector increased their wealth with 43%, while those with a few or no such citizens were almost bankrupt.

5 Conclusions:

5.1 Model conclusions

The conclusions of the run of our 4 scenarios in the ABM we constructed are the following: the effects of the policies can be seen, similar to what happens in the real world, several years. This can be observed here as well because for the 5 ticks run for all the scenarios the results are simmilar, while those for the 25 ticks run are completely different one from the other and most important, very different from the situation the model left. Another interesting observation is the fact that when the EU agent distributes randomly its incomes according to the population in each country, the results are better than in the scenario where it distributes it to the countries that have the most citizens employed in the service sector or the industry one, but not as good as the scenario where the EU distributes its income to the countries that have more employees in the farming sector. Perhaps this, even if just an ABM scenario should make the policy makers of evrey EU countr calculate more the choices they make.

5.2 Improvements that can be brought to the model

Because this model is a pilot one for the EU agent based model various improvements can be brought to it. A part of these that will be implemented in the authors' further research, are the following:

- Writing a piece of code that sets a seed button (a random number that NetLogo uses to calculate its random numbers) and gives the NetLogo model the possibility to rerun each scenario that is run on it.
- Another of the improvements that can be done for this model is to include the real data for the people employed in agriculture, industry and services and to give the EU citizens agents the possibility to reproduce.
- Another improvement that can be brought to this model is related to its graphics, the NetLogo world could have not only "relations between the countries" layer, but also a geographical one, because the countries could be arranged on a map of the EU. The population of each country will appear with every NetLogo run on the territory of its country.
- Creating firms owned by the government and privately owned firms that employ the population in each country.
- Allowing the countries to borrow value units from other countries and to make investments in the sectors it has (agriculture, industry or services sector).

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Productivity and Services: safety telephone services for the elderly

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The purpose of this paper is twofold. First, it aims to contribute to the services literature by identifying key components of service productivity. There is a research gap in the conceptual understanding of productivity in services. Second, this paper examines the use of service productivity components to advance productivity improvement. The case is safety telephone services, a type of technologically enabled care. Safety telephone services provide physical help when their customers need it. The services are mainly used by elderly persons. This study contributes by investigating if we can find those cases in which increasing organizational efficiency goes hand-in-hand with increasing value for customers so that organizations' needs and service users' expectations are in line and productivity is improved. (This paper is based on the dissertation by Molander, 2013. Our discussions have further crystallized the thoughts.)

1 The context

The population becomes older, and more outpatient and non-institutional home care is necessary. The services of the elderly receive much attention in state and local decision making in numerous countries. Preparing for the growing public expenses caused by the ageing population, places great challenges on the economy of the public sector. (Luoma; Rätty; Moisio; Parkkinen; Vaarama; Mäkinen, 2003) There is pressure to increase budgets for social care and health care. Organizations are facing several challenges in their efforts to better resort to closer performance evaluation that provides guidance in an elderly care environment. With respect to this, increasing productivity of elderly care services has become necessary.

Finland is one of the most developed economies in the world according to many rankings (World Economic Forum, 2009, 479), and in the forefront of social and economic development. It is useful to make this type of a study in Finland as it provides relevant information also for other advanced economies.

Population is aging due to lower birth rates and longer lifespan. This is considered by some the most important long term fiscal question in the industrial world. (Gruber; Wise, 2001) Practically all developed countries will have the ratio of working age population to retired population rapidly decrease during the first half of this current century. There will be almost 80 million elderly people with their care needs in Europe by year 2050, according to forecasts. (Leikas, 2008) According to population forecasts, one in four Finns (26.1%) will be aged 65 years or over in 2030. (Statistics Finland, 2009) In Finland, the average life expectancy for a female child born in the 1990s was over 80 years, and for a male child 73 years, as compared to 75 and 65 years, respectively, for those born in the 1970s.

The number of retired people in Finland has grown significantly, especially after 2005, and continues growing. The ratio of working age population to retired population will decrease in every EU country in the coming years. In Finland the ratio is developing in an unfavourable direction more rapidly than in any other EU country. Finland's ratio of working age population to retired population will be the worst among the EU countries from 2020 to the end of that decade. (Statistics Finland, 2009)

In Finland the proportion of persons aged over 65 in the population was estimated in 2009 to rise from 17% to 27% by 2040, and to 29% by 2060. The proportion of people of working age in the population will diminish from the then 66% to 58% by 2040, and to 56% by 2060. The number of working age people started to fall in 2010 when the large, post-war baby boom generations started to reach retirement age. (Statistics Finland, 2009) The baby boom generation is a term used in Finland for the generations born during 1945–1950, when the post-war birth rates were higher than usual. (Karisto, 2007, 91–108) Table 1 shows this population development.

Table 1. The Finnish population by age and gender at the end of 1960 and 2006, the population by age at the end of 2009, and the forecasts for 2040 and 2060.

YEAR		age 0-14 (%)	15-64 (%)	65- (%)	Total (%)
1960	women	28.5	62.5	8.9	100
	men	31.9	62.3	5.7	100
	population	30.1	62.4	7.4	100
2006	women	16.3	64.4	19.3	100
	men	17.8	68.6	13.5	100
	population	17.1	66.5	16.5	100
2009	population	17	66	17	100
2040	population	15	58	27	100
2060	population	15	56	29	100

The demographic dependency ratio, that is, the number of children and pensioners per one hundred persons of working age will rise rapidly in the near future. At the end of 2008, the demographic dependency ratio in Finland was 50.3. According to the projection, the dependency ratio in Finland will be 60.4 in 2016 and rise to 70.5 by 2026. In 2060, the demographic dependency ratio in Finland will be 79.1 (Statistics Finland, 2009), as shown in Figure 1.

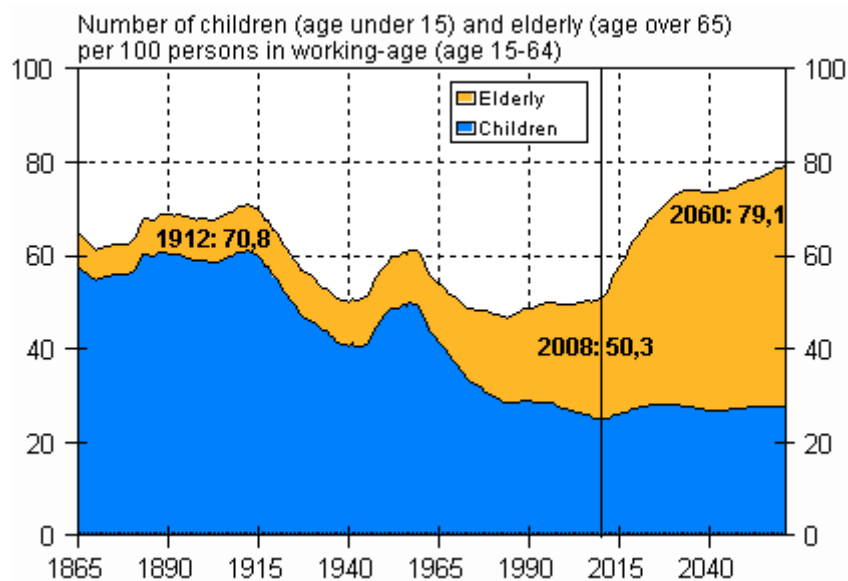


Figure 1. Demographic dependency ratio in Finland between 1865–2060.

The ageing population affects the social care and health care expenses. In 2006, the social care expenditure in Finland was 26% of gross national product. (Official Statistics of Finland, 2008). According to a forecast, the social care expenditure will increase to 30% of the gross national product in Finland by 2030. (Official Statistics of Finland, 2008) In 2006, the health care expenditure in Finland was 8% of gross national product. (Official Statistics of Finland, 2008)

2 The study

It has long been understood that the sustainability of any organization depends on well managed productivity. The objective for organizations should be to reach customer perspective objectives, in other words to create value for service users. The idea is to reach high value for customers while organizational efficiency is not neglected. Previous research results highlight the need for especially the public sector to take into consideration the issue of value for customers

when estimating productivity. (Kaplan; Norton, 2001) (Boyle, 2006) (Gummeson, 2008) (Simpson, 2009) Unlike a manufactured product, which can be readily assessed, in services, value is still an elusive and abstract construction.

Customers experience the value of services subjectively in many different ways. (Blois, 1985) If productivity is understood as it traditionally is in manufacturing and economics - as the relationship of output to input - any increase in productivity by this means would usually decrease customer satisfaction in service organizations. (Anderson; Fornell; Rust, 1997, 129–149) This does not create a sustainable increase in productivity. Minimising input is not always the right goal.

2.1 The objective of the study

The purpose of this paper is twofold. First, it aims to contribute to the services literature by identifying key components of service productivity. Second, this paper examines the use of service productivity components to advance productivity improvement to deal with safety telephone services for the elderly, which is technologically enabled elderly care. Various kinds of technologically enabled services are being developed with increasing speed.

There is a research gap in the conceptual understanding of productivity in services. Official statistics, reminded Gummeson (2008, 315–330), are deprived of value for customers and as such are obsolete and misleading in many respects. There is also a research gap in what could be done to improve services both from the organization's and the customers' point of view. This paper addresses these gaps by asking two questions:

- To increase value for service users, what has to be introduced to meet customer expectations?
- To increase organizations' efficiency, what does not constitute real value for service users and thus could be eliminated?

This paper is based on customer relationship management (CRM) theories (Reichheld, 1996) and lean principles. (Kindler; Krishnakanthan; Tinaika, 2007, 99–101) The paper looks at the input side of service production (efficiency) and at the same time the output side (value as customers experience it) studying ways to improve both in order to improve productivity in cases where quantifying is not possible. Furthermore this paper claims that expert defined quality is needed because customers do not always know what kind of services they would benefit from. (Lillrank, 2008)

2.2 Quality management

This study builds on the ideas of quality management (Selden, 1997) although most of the existing research studies do not explicitly address the service sector and as such are not directly applicable to this study. Quality management's quality control, quality assurance, and quality improvement actions are there to make sure that the given outcomes are accomplished on all the following three levels: a) quality policy level, b) level of strategic outcomes, using for instance the Balanced Scorecard (Kaplan; Norton, 2004), and c) level of operational outcomes, i.e., the daily management level.

The widely used Balanced Scorecard method, which is a strategic part of quality management, states that the purpose of quality management is to set goals and monitor that the goals are achieved. The goals are set on four levels: (Kaplan; Norton, 1992, 71–79)

- 1) learning and innovation: intangible assets – people, systems, and culture
- 2) internal business processes: to satisfy customers and shareholders - operations for effectiveness and efficiency
- 3) customers: how to create value for customers
- 4) financial: shareholder expectations, productivity and growth

Each of these four levels is linked in a chain of cause and effect from level 1 to level 4:

- Learning and innovation includes training programmes with the goal to improve employee skills (level 1).
- This leads to improvements in customer service (level 2), which, in turn,
- leads to greater customer satisfaction and customer loyalty (level 3) and,
- eventually to increased revenues and margins (level 4). (Kaplan; Norton, 2006)

The learning and innovation perspective (level 1) identifies the intangible assets that are most important to the strategy. The objectives in this perspective identify which jobs, skills, talents, and knowhow are most important for the organization. This perspective identifies which information systems, networks, and infrastructure, such as CRM systems, are needed. Employee competencies, technology, and systems such as CRM play a major role in improving operations. In addition, it identifies what kind of organizational climate and abilities are needed to mobilise and sustain the changes required to support the next level (level 2), the value-creating internal business processes.

2.3 The case

2.3.1 Structure

This paper is a deductive case study. It looks at matters from the organizations' and from the customers' points of view simultaneously and adds an outside expert view. A qualitative approach is appropriate in areas where research is at an early stage.

The study flow chart, shown in Figure 2, portrays how this study was structured starting from the theoretical foundation of CRM theories and ending with a way to investigate service productivity in situations where traditional ways are not possible or are not sufficient. Mixed methods are used; there are many items of evidence from many sources.

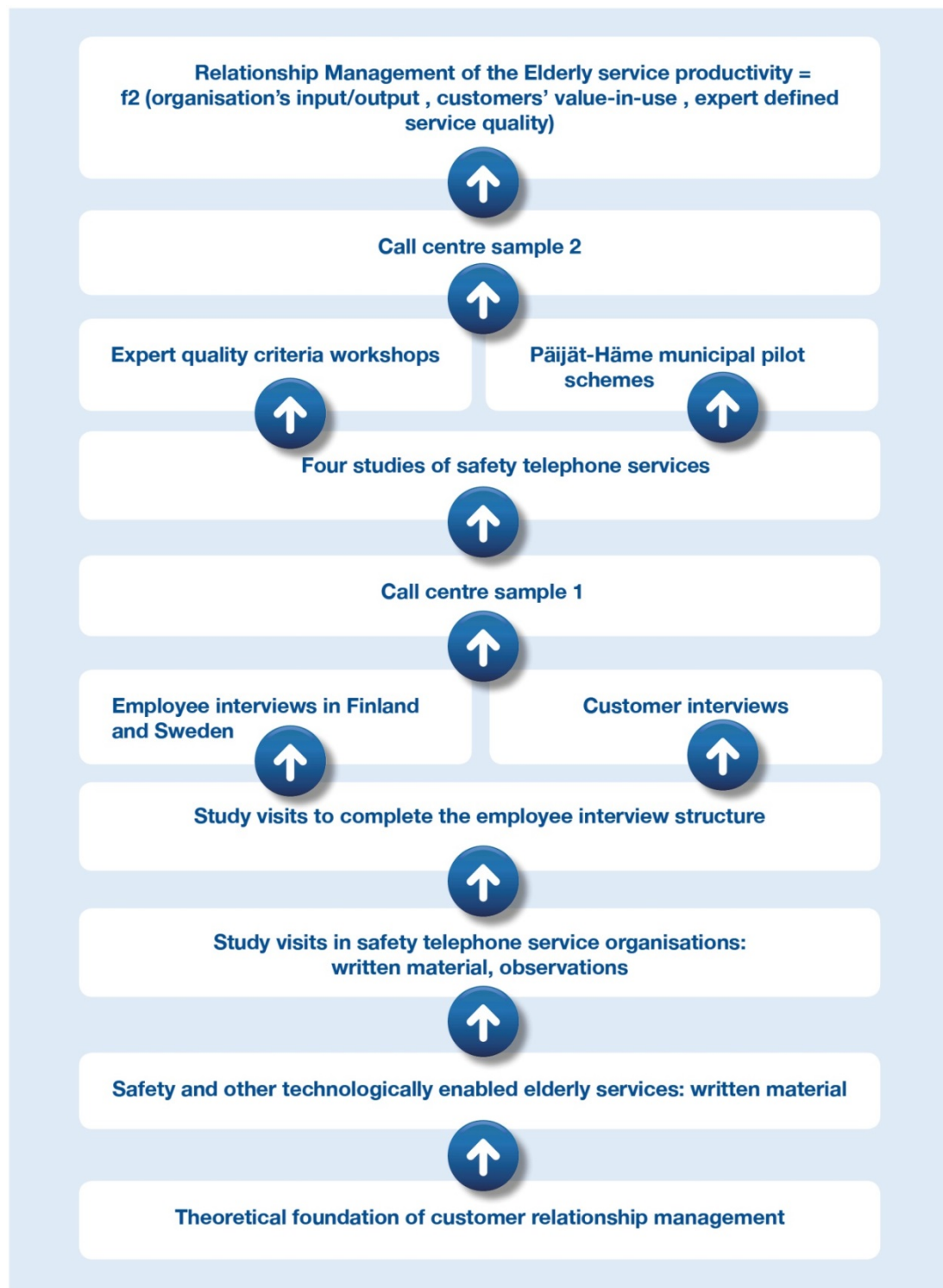


Figure 2. The study flow chart.

2.3.2 Value for service users

To increase value for service users, the question was proposed: What has to be introduced to meet customer expectations? This question refers to the idea of CRM (Reinartz; Krafft; Hoyer, 2004, 293-305) as a method of increasing an organization's effectiveness. CRM is one part of total quality management.

According to CRM theories, which were introduced by Reichheld (1996), customer satisfaction is conducive to enhancing customer relations, and it is profitable for an organization to have good customer relationships. Reichheld noted that long term relationships with customers cannot be established in a sustainable way if management only focuses on decisions creating short term benefits. Long term customer relationships create value for customers. When customers are provided with the services they are looking for, profits for the organization should accumulate. It may take time before customer relationships are developed in an organization. In customer relationship management, wrote Winer (2001), the attention "has changed from customer acquisition to customer retention", although it is sometimes difficult to distinguish between these two activities.

Appelqvist (2005) concluded, when studying the efficiency of industrial companies, that greater theoretical insights could be achieved by interpreting the collected data through the eyes of marketing management, including CRM. Grönroos (2007) concluded that the main focus in obtaining results is the continuous management of services and CRM. He pointed out that CRM brings the need to appreciate customers' expectations to all levels of an organization.

There is abundant research in the area of CRM both in industry and in services. This paper defines CRM as encompassing a myriad of activities across an organization, and aimed at ensuring productivity.

2.3.3 Organizations' efficiency

To increase organizations' efficiency, the question was proposed: What does not constitute real value for service users and thus could be eliminated? This question refers to the idea of lean services as a method of increasing an organization's efficiency.

Some organizations use a continuous improvement approach known as Kaizen. (This method became famous due to the book by Imai (1986)). The core principle of Kaizen continuous improvement is feedback. The purpose is efficiency by the identification, reduction, and elimination of suboptimal processes.

Lean information technology (LIT) (Kindler; Krishnakanthan; Tinaika, 2007, 99-101) is an extension of continuous improvement principles into the development and management of information and communication technology services. The central concern of LIT is the elimination of waste, which is seen as work that adds no value to a service. LIT can be used in the development of information and communication services. This affects efficiency, which is the input side of productivity.

Although lean principles are generally well established and have broad applicability, their extension from manufacturing into services has only emerged in the 21st century. Whereas LIT initiatives can be limited in scope and deliver results quickly, implementing LIT is a continuing and long-term process that may take years before the lean principles become intrinsic to an organization's culture. LIT promises to identify waste that causes poor customer service, lost business, higher than necessary operation costs and lost employee productivity.

2.3.4 Relationship Management of the Elderly

In one definition of the productivity of service organizations there is the efficiency of the organization on the input side, and on the output side the customers' view of the value of the services. Services are often tailor-made, and as such, they differ considerably between different customers and at different times. This leads to the conclusion that it does not serve any purpose if the outputs of service organizations are only counted in terms of numbers. An important measurement of a service organization's output is the subjective experience of its customers. Along with this point of view this paper looks into value for customers. Value is created by customers in the use of services and products, in co-creation with producers. Value is personal and implies the customer's involvement.

To learn about value, many methods have been developed. For the empirical part of this paper, a business area was identified where traditional ways of measuring value are difficult or in some cases even not possible. The way to define value here was to assess how well the services offered met customer expectations. It is important to have knowledge of customer expectations in order to create good value for customers.

Furthermore, this study points out that to avoid harmful decrease in value, limitations to the aspiration of efficiency should be implemented – one of such is that the organization is required to meet certain quality standards defined by experts. Customers do not always know what they need and may not have skills in technology.

Technical quality is probably necessary for most customers, but not sufficient, however. Expert defined service quality forms a judgment about an organization's processes and not the customer's. An organization and its customers can mean different things when they talk about the quality of services. Both views are needed. In this study expert defined quality and value for customers together define service effectiveness. Productivity of a service organization in this paper integrates an organization's input concept of efficiency and the organization's output concept of effectiveness. This can be expressed by the function:

$$productivity = f(organization's\ efficiency, customer\ experienced\ value, expert\ defined\ quality)$$

This is called Relationship Management of the Elderly.

According to Liu (2010), quality of services has in many studies been determined only from the provider's perspective so that organizations are generally focused on providing services that are technologically accurate and fast. Effectiveness is an important part of service outcome and the organizations' productivity. It is crucial to define both quality from the provider's perspective and value from the service user's perspective so that organizations can use the information in identifying bottlenecks in their operations and target for development, when they strive for improvements.

Productivity improvement can focus on real goals and effects that productivity improvement tries to achieve. Then it would be possible to move from quantity to combined expert defined quality and value for customers. Information that develops in contact with the customers can be utilised in creative ways to increase value for customers. Klaus and Maklan (2007, 115–122) pointed out that concentrating on customer experience blurs traditional distinctions between products and services because of the focus on customers' experience, which arises from combinations of products and services.

2.3.5 Data collection

This study used mixed methods. Data were collected in Finland and partly in Sweden from interviews of customers and personnel, and the study also examines 2830 safety telephone alarm calls. Moreover, expert defined service quality criteria were constructed by Quality Function Deployment-method (Mizuno and Akao, 1994) (Serkkola; Rauma; Molander, 2005). To avoid harmful decrease in value for customers, limitations to the aspiration of efficiency should be implemented – one of such is that the organization is required to meet certain quality standards defined by experts.

Call center services are, like any other services, perishable and heterogeneous, and service production and consumption take place simultaneously. What all these features mean as implications to the services is shown in Table 2. It shows the safety telephone call center service features and corresponding implications. A service process is a series of service encounters, where employees and customers, supported by systems and technology, meet and interact. In the safety telephone service environment, this happens through call centers and the help services. Although the help service is the core service of the safety telephone services, call centers are the main contact points for customers. As call centers are spreading in all areas of business, their importance can be seen more widely, too. Call centers are deployed throughout the world as a cost effective way of enabling a very large number of customers to interact with an organization.

Personnel and customer interviews were conducted. The interviews began with a short introduction of the research. The personnel interviews were conducted as theme interviews and proceeded according to their respective themes. Theme interviews pay regard to different views of different interviewees and to different meanings and contents they give to the same matters. The conversations were about call centers, management, customer expectations, and information transfer within safety telephone service networks.

Table 2. Call center operation features and the corresponding implications (Adapted to safety telephone services from Zeithaml; Parasuraman; Berry, 1985, 33–46).

Service features	Implications to services
Perishable	<ul style="list-style-type: none"> • cannot be stored • difficult to coordinate supply and demand • cannot be returned • cannot be shown without use • it is difficult for the customer to evaluate beforehand
Production and consumption simultaneous	<ul style="list-style-type: none"> • customers participate in the production • customers affect the end result • multiple distribution channels are possible
Heterogeneous	<ul style="list-style-type: none"> • production and value-in-use depend on employee actions • difficult to control quality and value-in-use • cannot guarantee that the service is that which has been promised

The interviews gave basic information on value for customers, on customer services in safety telephone service call centers, roles of call center operators, and content of information being transferred between operators and users. The interviews showed clearly the necessity to collect information in also other ways.

There were elderly people who did not know their own needs. That is why ways of studying the expectations of the elderly, other than the usual customer satisfaction surveys in the form of questionnaires, must be found. Further data were collected from alarm calls coming into a large national call center. The interviews permitted the development of the instrument that was used in the call center data collection.

As an example of how value for service customers can be investigated in the present day environment, this study looked at help requests coming in at a safety telephone call center and compared them to the answers given by the call center operators. (Molander, 2003) The incoming help requests represented customer expectations, and the compared answers represent how these expectations were satisfied. Giving help or sending for help contributed to meeting customer expectations and produced value. Up-to-date customer data also increased value for customers.

Furthermore, a second set of data about safety telephone alarm calls and the customers who made them was collected from a call center log database to shed more light on value for customers. This data concentrated on those cases where it was suspected that customer expectations were not met. The most recent alarm call of the selected customers had been made for a non-physical reason.

Workshops were also held. In one workshop, an expert group gathered. The experts were invited from the public sector help services, safety telephone service organizations, elderly care homes, and other organizations and companies in closely related fields to ensure a wide selection of interests. In selecting the expert group, care was taken to ensure that major official players in the field of safety telephone services were present.

A provider perspective of service quality was studied using the Quality Function Deployment method (Mizuno; Akao, 1994) involving the expert group. The group raised all the customer expectations that they thought were important. The Quality Function Deployment method was used to transform user demands into design quality and to deploy methods for achieving the design quality into subsystems. For safety telephone services the experts weighted the received alarm calls and help services according to their understanding of the importance of each part in the whole service system.

This can be considered a good approach when the assessed quality is used to limit the efficiency of organizations, and real customer expectations and value are found in other ways. The acceptable expert quality level was defined. This is the Zone of Tolerance model (Yap; Sweeney, 2007, 137–148) type of threshold. Also to evaluate effectiveness, it helps to find expert defined quality criteria since there are those among customers who do not know their needs. Also other methods than Quality Function Deployment could be used to set expert standards for the services.

These quality criteria are meant to benefit both private and public sector suppliers of safety telephone services, as well as buyers of these services. These quality criteria are not adequate alone for service effectiveness and customer satisfaction. Value for customers requires, in addition, another approach.

According to Frei (2006, 92–101) customers introduce variability to service processes in no fewer than five ways, so it is critical to determine which are causing mischief for efficiency before designing interventions. One type of variability that creates challenges for service companies is the "arrival variability", meaning that customers need services at their time of convenience; not all customers want to have service at the same time or at times necessarily convenient for the organization.

"Request variability" implies that customers' desires do not emerge along the organization's standard lines. Film enthusiasts may recall the diner scene in the film *Five Easy Pieces*, in which actor Jack Nicholson asks for a side order of wheat toast. The waitress tells him that they "don't have any side orders of toast" although toast is included in several meals in the menu. This is one way to limit request variability. The fact that customers' desires do not emerge along standard lines poses challenges for virtually every kind of service.

"Capability variability" means that organizations must work with customers whose own capabilities differ. This may be because of greater knowledge, skill, physical abilities, or resources, but some customers perform tasks easily and others require hand-holding. In a safety telephone service setting, a user may be more or less able to describe his/her situation or use the service at all, and this will affect the quality of care the user receives.

The fourth type of variability that creates challenges for service companies is the "effort variability", meaning that it is up to the customers how much effort they apply to the service task. The fifth, the "subjective preference variability", means that customers vary in their opinions about what it means to be treated well in a service environment. These last two are personal preferences, but they introduce as much unpredictability as any other variable and make it somewhat more difficult to serve a broad base of customers.

2.3.6 Results

This study handles organizations' productivity, expert defined quality and value for customers in an organizational context which is practically untouched in previous research studies. The research showed that productivity could be improved without metrics. The constructs of productivity have received limited research attention in qualitative literature.

This study used mixed methods. Many items of evidence from many sources were used. They yielded the same line of findings. Interviews of customers supported interviews of personnel. Safety telephone alarm call data were supported by the interview findings. Moreover, expert defined service quality criteria were supported by earlier findings from other sources of knowledge. Using multiple sources of evidence in the data collection phase increases validity, (Flick, 1992, 175–198) (Silverman, 2001) (Riege, 2003, 75–86) as this study did by collecting documents, interview tapes, and data samples for protection against researcher bias.

Results on value

The first research question - to increase value for service users, what has to be introduced to meet customer expectations - was looked into by dividing the question into two other questions: what services are received and how are the services received? Grönroos defined technical quality as what is received and functional quality as how the services are received. (Grönroos, 1988, 10–13) In this paper, expert defined quality and value for customers answer these questions.

Organizations worked with customers whose capabilities differed. Some customers were able to express their views better than others. Therefore some of the customers could not be interviewed in addition to which interviews would be costly and time consuming. Other methods were developed to discover customer expectations. Actual behaviour was investigated here because people could not always express themselves. They did not necessarily even know what was best.

The way to define value here was to assess how well the services offered met customer expectations. Comparing the services customers asked for and the services provided to them indicated whether customer expectations were met. This study showed that customers had their ideas concerning the contents of the services but many times the services did not meet these expectations. Customer expectations were observed by means of wellness technology. With the help of modern technology, customer expectations could be followed quickly and easily. It is acknowledged that technology development and utilisation may play a major role in improvement of productivity. (Melkas, 2013)

The incoming help requests represented customer expectations and the compared answers represented how these expectations were satisfied. Giving help or sending for help contributed to meeting customer expectations and produced value. In 76% of the customer alarm calls, customers did not ask for physical help, and there is evidence that customer expectations were not met. The sample of safety telephone alarm calls shows that in 24% of customer safety alarm calls customers had a physical help request and service was provided to the customers. In those cases we could see that customer expectations for services were more or less met.

Organizations saw some problems in fulfilling customer expectations in some cases because the background data of helpers and their telephone numbers were not in order. This could cause delays in providing help. Call center services of even the same organization were different at different times because the production of the services was, as always,

based on individual employees and thus were heterogeneous. It was difficult to control the value of call center operations because it is people who provided the services.

A help service had no value for customers or had only reduced value if the call center answered calls too slowly. It is difficult to build a competitive advantage based only on the functioning core service of providing physical help for the customers. To be competitive, an organization has to offer customers something more in comparison to other organizations. (Ylikoski, 2000)

Results on efficiency

There was an urgent need to further investigate closer what the expectations of the customers in the 76% of the safety alarm calls were, when customers did not expect physical help. The 55 customers of the second sample of customer alarm calls repeatedly made non-physical alarm calls. When customers made alarm calls and did not ask for physical help, customer expectations were not met by safety telephone services.

There was an indication of user expectations as regards social contact. Call center operators seemed to identify these users who made “social calls” daily. There was little or no attempt to solve this problem, which caused inefficiencies in operations. These users repeated their “social calls” over and over again. Call center operators knew these particular customers and their habits of making frequent calls. The existing services were burdened with such lack of efficiency.

Information is increasingly available through advanced computer solutions making it possible, at least in theory, to serve customers individually with customised services. However, too much customising can ruin a service providers’ efficiency. The question for safety telephone service providers and other elderly services is how to tailor their supply according to the distinct needs and characteristics of their customers. The supply architecture must be robust in order to be applicable to different demands in different customer situations. The goal could be to separate out customers who are currently harming the organization. This should allow the organization to think of other ways of serving those customers for whom the organization’s services are of no value. How customers perceive the value of services should affect the service offering. (Zeithaml; Bitner, 2000) Customers’ value and service organization’s productivity could be increased at the same time by minimising disturbance to the service production. It does not help to have high technology if service processes left room for uncertainties about customer expectations. Uncertainties could create mistakes and delays in providing services.

Technology was a help to call centers in identifying customers. Therefore, up-to-date customer data was an integral part of giving and receiving physical help when expected. Up-to-date customer data increased value for customers. It also enhanced efficiency because, for instance, then employees did not need to make several phone calls to different numbers. Safety telephone service organizations needed to ensure that their customer database only included correct information. A concern about this was raised during this study.

Investigating incoming customer alarm calls, this study found a two-fold problem in that some customer expectations were not met and these same customers also burdened the organization with demands. The organization did not even try to meet these demands and this harmed the organization’s efficiency. With the help of technology, the organization collected a considerable amount of useful data from its customers. However, the data were not used. With the help of this rich data of customer behaviour, which could be interpreted as customer expectations, the organization could ease the situation by increasing value for customers in order to decrease the burden caused by the demands on non-existing services.

The second research question was: To increase organizations’ efficiency, what does not constitute real value for service users and thus could be eliminated? Customer activity data gave information on how to service customers so that value for them could be increased and that organizational efficiency also could improve. Better value for customers goes here hand-in-hand with organizational efficiency. The results of this study clearly showed that service providers can improve things for their customers and, at the same time, also increase their own efficiency. This means increased productivity, which is the aim of every organization.

Using the best available databases requires that personnel have access to the database, the development of best practice guidelines, and the development of implementation plans in response to new data. Using information is not always straightforward for personnel, given the pressures of time and other commitments. Using data in a creative way puts pressure on the efficient use of an organization’s resources. Training personnel consumes more resources and again puts pressure on the efficiency of the organization. These must be taken into consideration when increasing value, so that the resource increase does not increase production expenses but decreases them in the long run. By solving inadequate and non-effective parts of the services, organizations can be brave in taking favourable steps in improving customer value, which can create a win-win situation for both customers and organizations.

2.3.7 Discussion and conclusions

If we tried to apply quantitative methods in the productivity of elderly care services, we would run into difficulties in measuring effectiveness. To successfully apply Relationship Management of the Elderly means that the traditional metrics used by organizations to measure the success of their services have to be updated. Financial and market-based indicators are important (Lehmann; Winer, 2001) but not used in this case. The quality of services provided may have seemed good from the service provider’s internal point of view even though customers complained. The service provider may not understand why customers were complaining as the services and technology were according to agreed

standards, personnel were trained, and the service network adequate. However, there is more than this to value for customers, as can be seen in this paper. An organization and its customers can mean different things when they talk about the quality of services. Both views are needed.

It was shown in this study that call centers can play a major role in answering the problem of recognising customer expectations beyond physical help expectations. The approach was taken here to look at customer satisfaction through call center operations. Recognising customer expectations and assessing the help required represent key elements in the strategy of providing help for elderly customers. The recognition of expectations is typically sometimes complicated because the customers in services for the elderly can be physically, recursively, or mentally impaired.

Customers did not always understand who to turn to. The elderly cannot be expected to be trained to distinguish between service providers. Making a distinction between service providers is often difficult even for those with all their cognitive abilities functioning well. The elderly expected some kind of help and if they did not get it, they pushed the safety telephone device button over and over again. In 76% of customer alarm calls no physical help was requested by the customers. So, in most of the alarm calls made by users, their problems remained unsolved. As a result the effectiveness and efficiency of the safety telephone service organization suffered. It seems that safety telephone services did not serve the users as well as they could. Organizations also did not seem to run as efficiently as they could.

Organizational efficiency aspirations can decrease customer experienced value. This study found a solution in which increasing organizational efficiency would go hand-in-hand with increasing value for customers; the result being that the organizations' needs and the service users' expectations would be in line. Based on the results of this study it is reasonable to argue that services can be planned, implemented, assessed and continuously improved to meet the needs of the customers whenever the services are used. With such actions it is possible to increase both customers' value and the productivity of services. Efficiency and effectiveness could be improved thus increasing the productivity of the organization. It could clearly be shown how to increase efficiency and to increase value to customers at the same time by looking at customer behaviour and organization's responses to it.

Call center operators of safety telephone service organizations interact with customers and they have a direct impact on value for customers. They can be called relationship promoters. (Melkas, 2004) The idea behind Relationship Management of the Elderly is to increase customer contact points, to investigate customers' reactions to these contacts, and to develop immediate responses to possible negative experiences. One of the key features would be to manage multichannel interactions. Successful businesses influence people through experiences, and these experiences render personal value. (Pine; Gilmore, 1998, 97–105) It can be seen from this study that a service provider created an experience every time it interacted with a customer. Although everyone in the organization is responsible for offering good quality services and every employee affects directly or indirectly value for customers, it is the call center operators who are in a key position here.

The problem was the adjustability and flexibility of employees to the expectations of the customers. Safety telephone services were not built for social calls, although this study shows that customers most often asked from them. Social calls were repeatedly made by the same customers. For the services to function effectively and efficiently, those customer expectations should be answered by someone. Safety telephone service organizations would benefit from taking care that the social calls get answered by them or by someone in their network. Call center services could thus meet customer expectations much better than they do presently. Organizations could develop services individually and together with networks of other service providers in order to provide complete services.

Any contact that customers have with an organization is a customer service encounter. Dissatisfied customers seemingly hurt the organization. New tools are needed to service those customers who at present receive no service. The organization can develop the tools within its organization, create a new organization for the services or join other existing service organizations. A manageable number of alternative modular service offerings, which can be adapted to individual customer situations and requests, could be developed. The idea is to develop optimum operative efficiency for the organization within the constraints set by customer requests and by expert assessment of quality.

Developing technology changes service production and gives an opportunity to increase productivity. For this study, a business area was identified where customers had their own ideas of the contents of the services, but the services provided do not meet these customer expectations. This could reflect the wider problem that elderly care services face a gap between elderly people's expectations and services provided by organizations.

As this study showed, safety telephone call centers collected a considerable amount of information about their customers, but the data were not used within the organization - or more generally within social and health care services to gain a better understanding of customer expectations or to give better services for customers. Such customer information could also become part of systematic planning and evaluation of elderly care services in general. The role of call center operators could be taken to a novel level in that user needs through call centers would have a real impact on social and health care services produced. This would be a new approach to such social service related work.

It is vital that medical and other information is included in elderly care services such as safety telephone services. Laws should not prevent the rational operations and forming of networks for those elderly care services that provide essential help. Privacy issues need to be taken into consideration but they should not prevent customers from getting proper help in whatever area they expect it.

Public sector organizations are dependent on ministries, other administrative bodies, and politicians in decision making. To develop services requires co-operation among everyone in the field. If technology is used to help in

developing value and efficiency, those possibilities, if used, make people happier both on the production side and on the consumption side.

With the help of modern technology, customer expectations can be followed quickly and easily and customers could co-create with the organization. In this study, this is referred to as Relationship Management of the Elderly. This type of an approach could be useful even in the development of other services for other ages and in different contexts. The approach of this study may be generalised beyond safety telephone service organizations. The approach may be used in many other situations and is useful especially where customers do not know or cannot express their needs. Childcare, preschool education, the healthcare of mentally disabled persons and many other similar situations provide opportunities to use this approach.

Based on this study, it can be recommended that further research is needed in value for customers, effectiveness, and productivity in social and health care, and more generally in all services. A multi-party focus means that long-term relationships should be built, not only on customer expectations but also on the expectations of other stakeholders like employees, suppliers, intermediaries, public sectors, and more. Using general network theory (Melkas, 2004) (Gummesson, 2008, 315-330) in future research could bring more clarity to the difficulties of managing networks.

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Human or Technological Resources in XXI Century Schools: An Empirical Analysis

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Service and service innovation theory provides a powerful framework to understand how education is provided by breaking down and representing education as a set of characteristics. Two of the world strong education performer's countries, Finland and Korea, have been able to effectively educate every child regardless their socioeconomic level. Each country has implemented different strategies, leading to very different forms of education provision raising the question of the role played by human resources and/or technology in education provision. Using each countries individual sample of the PISA-2012 database, we employ multilevel models to investigate this quandary. Results suggest that human resources (competences) and technology (technical characteristics) influence student outcomes in both cases. Nevertheless, for each case there is a set of core competences and technical characteristics influencing the overall set of outcomes considered.

1 Introduction

A way to understand how education services are provided is by analysing education from a service perspective. Service and service innovation theory (Gallouj and Weinstein, 1997; Gallouj 1994, 2002) provides a powerful framework to understand (and measure) how education is provided by breaking down and representing education as a set of (service and social) characteristics, and more important, it clearly grips with and reveals ways to improve its dynamics, by modelling innovation in education and education (service) innovations. Gallouj & Weinstein's (1997) theoretical construct bases its fundamentals on the work of Lancaster (1966, 1971) and Saviotti-Metcalf (1984), by linking the intrinsic characteristics of education to a set of underpinning technical characteristics and competencies. Improvements in the technical characteristics and/or (actor's) competencies can lead to enhance the quality of the associated education characteristics that are of interest to students. This theoretical construct suggest that education (intrinsic) service characteristics (outputs) may depend on a bundle of technical characteristics and/or competencies, but more important, it also suggest possible overlapping of a bundle of technical characteristics and competencies underpinning (a single or) a set of service characteristics.

This latter concern is prominent to the point that Gallouj and Weinstein (1997) suggest that depending how technical characteristics, competencies and final service characteristics change or recombine will lead to different modes of innovation, clearly emphasising a specific relationships between each sets of characteristics. In fact, this issue has been highlighted by Windrum's (Windrum et al., 2009) reading over the Saviotti and Metcalf (1984) model relating technical and service characteristics - clearly extensible to the enhanced Gallouj and Weinstein's (1997) model - emphasising the possible existence of multiple and complex relationships between clusters of technical and service characteristics, but more interesting, the fluidity of their relationships over time. These considerations imply that education can become a complex service¹⁷⁹ in the sense that the delivery of education can combine several interfacing possibilities between learners and education providers influencing education outcomes in different ways.

Recent results of the Program for International Student Assessment (PISA 2012 Results in Focus, 2013) of the OECD¹⁸⁰ conclude that two of the strong education performer's countries, Finland and Korea, have been able to effectively educate every child regardless their socioeconomic level (including their origin or ethnicity)¹⁸¹. To do so, each country has implemented different strategies, leading to very different forms of education provision. While Finnish emphasise on high trained and empowered teachers, student early intervention (special lessons and individual support) and weekly (multidisciplinary) team teacher (and other school staff¹⁸²) meetings, Koreans encourage student hard work (in and out of school) and active learning (participatory, creative and independent) by integrating ICTs in their daily learning (digital textbooks and cyber-home) which is complemented with parent interest. From the service and service innovation theory perspective, these two ways of providing education clearly raises the questions of the role played by human resources and/or technology in education provision, but also (at the same time), the validity if the same set of

¹⁷⁹ Given the complexity of education services, OECD/CERI has launched several projects aimed to better understand its dynamics. Projects developed are Education and Social Progress, Governing Complex Educational Systems (GCES), Innovative Learning Environments (ILE), Innovative Teaching for Effective Learning and the Innovation Strategy for Education and Training.
<http://www.oecd.org/edu/ceri/innovationstrategyforeducationandtraining.htm>

¹⁸⁰ <http://www.pearsonfoundation.org/oecd/> and <http://www.oecd.org/pisa/keyfindings/pisa-2012-results.htm>

¹⁸¹ Recent results of the PISA 2012 conclude that both countries (Finland and Korea) combine high levels of performance with equity in education opportunities (PISA 2012 Results in Focus, 2013)

¹⁸² Which can include among others, pedagogues or school principals.

technical characteristics and competencies influence several (and different) education outcomes (e.g. math, science and reading)¹⁸³.

Considering these facts, our research hypothesis guiding our work will be:

Hypothesis 1: Service and service innovation theory suggests that education outcomes are underpinned by a bundle of technical characteristics and competencies, but at the same time, possible overlapping vectors of these characteristics can exist influencing several but different outcomes (Gallouj and Weinstein, 1997; Windrum et al., 2009). Our first hypothesis will be to contrast to what extent, the same set of technical characteristics and competencies influence several (but different) education outcomes (as measured by PISA 2012, namely 15 year old students math, science and reading test scores) for each of our cases analysed.

Hypothesis 2: Given the fact that different ways to provide education are equally effective (OECD/PISA 2014), our second hypothesis will be to contrast to what extent technical characteristics (technology) and/or competencies (human resources) influence several but different education outcomes (as measured by PISA 2012, math, science and reading test scores).

To do so, we will use each country's individual sample of the PISA-2012 database at student and school levels, and given the nested nature of the data, we employ multilevel (or hierarchical linear) models. Estimations have been made from a comparative approach, in a case-to-case basis. In the best of our knowledge, there is little evidence in research covering these issues (assessing education from a service and service innovation perspective) from an empirical point of view¹⁸⁴.

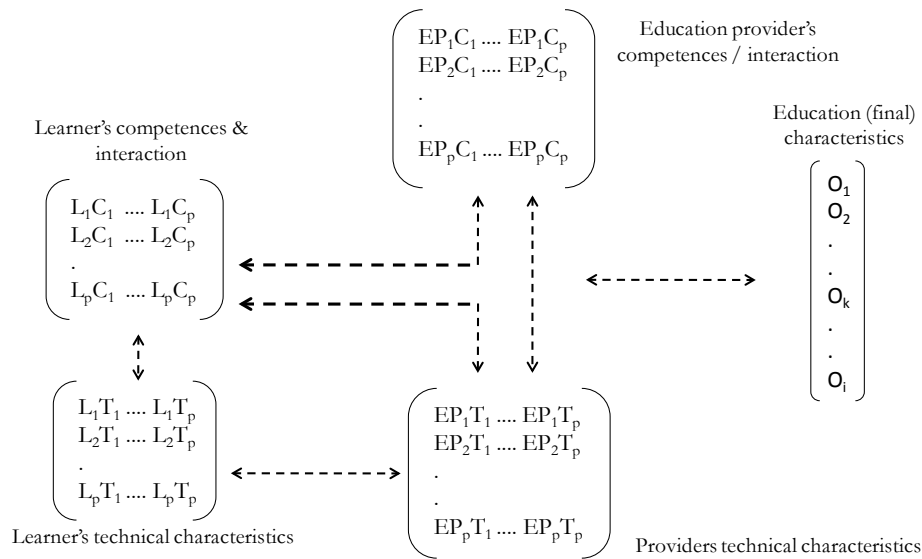
With this purpose, this paper is structured as follows. Section 2 presents the theoretical framework describing/representing education as a set of service (and social) characteristics, framing the link between the intrinsic characteristics of education to a set of underpinning technical characteristics and competencies. In the following sections, we present the data used, countries samples of the recently launched PISA 2012 database, and describe the variables, namely those related to the technical characteristics, actors competencies and education (intrinsic) characteristics – 15 year student test scores in the domains of reading, math and science (Section 3), and the methodology used, two-level hierarchical models (students in schools) are described and justified, including specification steps followed for modeling each case that gives answer to each of our research hypothesis (in Section 4). Section 5 presents the results and discussion, including a brief robustness analysis. Section 6 presents the concluding remarks and the general conclusions.

2 Theoretical framework: Education as a set of characteristics

Education as a service has some specific characteristics; it is intangible, interactive, requires certain simultaneity and can be defined in terms of co-production. Furthermore, this service traits, involve human relations, which lead to social (and community) interactions, suggesting that learners and educational providers interact (and co-produce) within educational communities (Rubalcaba, 2013).

¹⁸³ A third question would be how technical characteristics and competencies influence several (but different) final service characteristics over time. Given the data analyzed, this question becomes difficult to answer at this stage.

¹⁸⁴ Examples in this field addressed by the service and service innovation literature are Miles (1961) and Fuch (1965) or more recently Soette and Miozzo (1989) and Miozzo and Soette (2001) which aim to explain (uncover, classify or even theorize) the complexity of relation between "technical (or actors competencies) and service characteristics" of general services, including education.



Source: Own elaboration adapted to education building over Gallouj & Weinstein (1997) and De Vries (2006)

Figure 1. The characteristics-based representation of (education) services.

The framework. Considering these set of characteristics, education can be represented by the characteristics-based approach to goods and services (Gallouj and Weinstein, 1997; Gallouj 1994 and 2002)¹⁸⁵. This theoretical construct allow us to represents education as a system of interrelated vectors/matrixes (See Fig.1). We present an extended version¹⁸⁶, which includes five vectors/matrixes. Matrix L_nC_p represents the competencies of the different users (knowledge and abilities), and their co-production abilities (student behaviours and student interactions)¹⁸⁷. Matrix EP_mC_t represents the competencies (again, their knowledge and abilities) of the provider as well as their co-production abilities (highlighting again, provider's behaviours and providers interactions). The L_nT_q matrix represents the technical characteristics of education associated to users and matrix EP_mT_v represents the technical characteristics of the service (which normally are associated to providers). These later technical matrixes include tangible technical characteristics or intangible technical characteristics associated to the education service, in such a way that they can be used repeatedly for the provision (learning and teaching) of similar "ways" of education or different kinds of education (depending on whether they are more or less generic or specific). The final service outcome is represented by the vector O_i and is the result of the co-production capabilities of the user (matrix L_nC_p), the competencies of the provider (matrix EP_mC_t) and the technology of the users (matrix L_nT_q) and the providers (matrix EP_mT_v).

The model dynamics. Arrows in Figure1 draw attention on the co-production abilities of the users as being determinant of the service outcome. This means that student's play a relevant role in education provision including the use of a specific education service - the product (De Vries, 2006). Moreover, it also denotes the way service (education) is provided or deliver (high lightening the role of providers, its interactions and co-production with students), which could therefore be defined as the simultaneous employment of technical characteristics and competences ultimately used to produce the service (or final) characteristics (Gallouj, 2002; Gallouj and Savona, 2009), or what De Vries (2006) calls the co-production relationship, which can include several particular cases (Gallouj and Wesintein, 1997) such as: (1) a pure service (relating the users and providers competences and the service characteristics vector/matrixes), (2) a pure material good (linking the providers technical and service characteristics), as addressed by Saviotti and Metcalfe (1984) and Windrum et al (2009), or even (3) the link between users competences and providers technical and service characteristics, which can be considered the self-service characteristics (Gallouj and Wesintein, 1997; Gallouj, 2002 or De Vries, 2006).

¹⁸⁵We must emphasise that Gallouj and Wesintein's (1997) theoretical construct can be applicable to services but also goods (Gallouj and Savonna, 2009; Gallouj and Djellal, 2010). This means, they integrate tangible and intangible elements applicable to goods and services, following the idea initially proposed by Lancaster (1966 and 1971), to define or represent a product by its characteristics.

¹⁸⁶Based on Montes, Gallouj and Rubalcaba (2014)

¹⁸⁷This way of representing the "user vector" as a matrix of serveral users is supported by the importance of users' interrelations (possibility of interactions), underppined in the case of education on the so-called peer effect (Nechyba 1999; Burke and Sass, 2011; Duncan and Murnane, 2011 Sacerdote 2011; Borgonovi et al 2013), which exerts influence over education provision and outcomes directly (face-to-face) either in school or out of school, or indirectly (e.g. throughout social networks, email, etc.). Similarly to providers (See De Vries, 2006), the existence of multiple users and their interrelations (including the co-production with providers) opens the need to enhance the individual user competence and technical vector to an array of different competences and technical vectors associated with each user. In fact this ideas was partly considered by Von Hippel (1988).

These (special cases or) ways of provision or delivery of education (See Annex I presenting some specific examples), lead in fact to a better understanding of education characteristics, providing useful insights of the co-production abilities and technical characteristics. For example, one can think how traditional education is provided (See Annex I – Fig.5). Very briefly, education providers (normally "the" teacher) co-produce in class with a group of students where student also, interact between them and co-produce with the teacher. This co-production normally encompasses teachers explaining a group of students (or more individual explanation) the content of a topic (e.g. math). To do so, teachers use their competencies (e.g. math and pedagogical knowledge) and co-producing abilities (e.g. enthusiastic, organized and student sensible) and some specific "technical characteristics" of the service (e.g. explaining using a digital blackboard & based on a textbook). The outputs of the service can include a "better understanding of a difficult topic given teachers clear explanation", "student motivation given the teachers enthusiasm " and "higher test scores at the end of the year".

Applying this idea in modern education (See Figure 1), we can mention for example that in a school day, education service can include (1) a direct contact between the students (LC) and teachers (EPC) with certain competencies improving learning throughout the teacher-student relationship (e.g. teacher mentoring a student or a direct explaining of a topic/issue), further, (2) students can "co-produce" throughout provider's technology, relating the LC matrix and the EPT matrix, like in self-service (e.g. downloading material from the virtual web at school and reading it). Moreover, (3) a link between providers competencies (EPC) and their technology (EPT) can be implemented (e.g. working over class-presentations and uploading the material in the school on-line application) or even (4) link between student competencies (LC) and its technology (LT) can take place (e.g. a student using a personal computer/calculator to check math problems answers). This latter examples suggest that competencies of provider's or students can be codified and represented in the provider's technical vector (De Vries, 2006). Furthermore, co-production abilities can deal with interactions and behaviours between students, (5) linking the competencies ($L_n C_p$ vectors) of several students (e.g. attitude to help a peer to solve a math problem or provide school material - own notes or references- to some peers or even well-behaving - listening in class, paying attention, being quiet - during collective study/learning). This form of interaction and behaviours can also take place between providers, (6) relating providers ($EP_m C_p$) competencies (e.g. team teacher planning or preparing a workshop with parents or local actors, arriving sharply to class). Outputs in general (O_i vector) - following Gadrey's (1996) dissociation can include personal mentoring activities or a personalized curricula, easy access to a school subject content, or even achieving good grades in one or different subjects.

The evidence. Education research in the last decades (Sliwka, 2003, Instance and Sliwka, 2006; Beck and Kosnik, 2006; Vieluf et al., 2012; Van de Broek, 2012, OECD/ILE Project, 2012; Instance and Kool, 2013) suggest that education can be influenced by social and technical resources. This means that within an education service, groups of providers deliver several "educational services" to students, students also contribute to this delivery process throughout their co-production abilities and the "technical" link between students-providers opens new forms of co-production throughout more technological channels.

This implies that education can become a complex service in the sense that the delivery of education can combine several interfacing possibilities between several users and providers (competence and technical characteristics) and (final) service characteristics. In fact, this consideration has been highlighted before, as stated by Windrum's (Windrum et al., 2009) reading over Saviotti and Metcalfe (1984) model relating technical and service characteristics, emphasising the possible existence of complex relationships between clusters of technical and service characteristics as well as the fluidity of relationships over time. This fact is fully applicable in education.

3 Data and Variable Description

3.1 The Finnish and Korean PISA 2012 countries samples

The data used in this research come from the Program for International Student Assessment (PISA) 2012, and refer to the Finnish and Korean country samples. The selection criteria for choosing these countries (samples) has been on the one side, their excellent combination of high levels of performance with equity in education opportunities (PISA 2012 Results in Focus, OECD, 2013) and in the other, their markedly differences on their provision of education (OECD, 2011; Pearson/OECD video transcripts). PISA is an international assessment survey that measures students' abilities in the domains of reading, mathematics and science. According to the OECD (2012a), PISA focuses on young people's ability to use their knowledge and skills to face the challenges of real life and not to master a specific curriculum. Moreover, PISA takes place every three years, focusing on 15 year students, from OECD and partner countries. Five waves of PISA have taken place, namely 2000, 2003, 2006, 2009 and 2012. The PISA 2012 survey covers 65 countries and economies around the world. In addition, each wave has focused on a specific domain. In 2000 the focus was on reading, in 2003 its' focus was in mathematics and lastly, in 2006 it focused in science. The PISA-2009 and 2012 editions focused again in reading and mathematics literacy respectively. The Finnish and Korean countries samples contains 8.829 and 5.033 students from seventh to 11th grade ($M_F = 8,81^{188}$ and $M_K = 9,94$; $SD_F = 0.43$ and $SD_K = 0.24$) nested in 311 and 156 schools respectively.

¹⁸⁸ In the case of Finland compulsory education begins at the age of 7, covering 9 more years, thus, when taking PISA-2012 tests, students are normally in 8th grade on average.

3.2 Variable description

When choosing the variables we have followed our theoretical framework discussed in section 2, the enhanced characteristics-based approach to goods and services. Collecting (from PISA2012 database) data following this framework allow us to clearly identify a wide set of variables related to each characteristics vector/matrix considered in the service provision (actors competences and co-production abilities, and technical and service characteristics). Further and more important, assessing education from a service perspective allow us to investigate the existing statistical relationship between actor's competence and technical vectors and service characteristics. The variables considered in our analysis are presented herein below.

Dependant variable. The dependant variable are the standardized test scores achieved by students in the domains of math, science and reading. The argument for choosing these variables has been considering a set of education outcomes (service characteristics) normally result of education provision

*Table 1. Country Math, Science and Reading Test Scores
Finland and Korea (Dep. Variable).*

Variable	N	MIN	MAX	Mean (*)	SD (*)
FIN Math AVG	8.829	165,50	790,69	518,75	85,30
FIN Science AVG	8.829	128,44	852,87	545,44	92,96
FIN Read AVG	8.829	99,71	817,83	524,02	94,67
KOR Math AVG	5.033	161,11	888,82	553,77	99,09
KOR Science AVG	5.033	182,26	815,68	537,79	81,91
KOR Read AVG	5.033	109,42	784,34	535,79	86,54

Source: Own calculations using the Finnish and Korean countries samples of the Student PISA-2012 DB. (*) Countries average means and standard deviations have been computed as the average populations means and standard deviations of each plausible values (PV) for each domain. Further, each PV populations mean and standard deviation for each domain has been computed using Balanced Repeated Replication (BRR) (OECD, 2009).

For each literacy-domain (reading, mathematics and science), PISA2012 data reports for each student, five plausible values (see Adams and Wu, 2002). The general scale used¹⁸⁹, is transformed to reach an average of 500 (points) with a standard deviation of 100 (points) using a linear transformation. When a student's score is close to a point of the scale, it's more likely that students successfully respond to the items that are at that point or below it (score) and likewise, students are less likely to respond to items that are above that score. For our empirical analysis, in order to estimate the unbiased "population" estimates of our interest, we have followed the PISA Data Analysis Manual (OECD, 2009, 129–130).

Independent variables. Independent variables are presented herein below following our theoretical construct in section 2 and the aims (hypothesis) of our research. This means first, we describe the student/learners competencies (which include student general background variables, gender, origin and family composition), as control variables, general competencies associated to cumulative knowledge and abilities to the date, co-production abilities, namely related to behaviours and interactions and technical vector characteristics related to students, secondly, we describe the education providers vectors competence characteristics (namely those related to teachers, principals and parents), and lastly, we describe the technical vector characteristics of education, these latter variables are associated to the schooling process in broad sense, this means considering an ample set of characteristics that can be from particular school resources to more procedural and intangible know-how.

¹⁸⁹ This is estimated on standardized scores, which are based on mean zero and standard deviation 1. OECD-PISA (2012a)

Table 2. Learners (Students) Competence & Technical Vector Characteristics.

Variables	T	FIN (N = 8.829)		KOR (N=5.033)	
		m/f	sd/%	m/f	sd/%
Student Socioeconomic Status (ses)	cont	0	0,83	0	0,74
Gender (male)	dum	4.459	50,5%	2.691	53,5%
Native (native)	dum	7.406	83,9%	5.005	99,4%
Att Kinder 1 year or more (ISCED 0: kinder_more1)	dum	5.930	67,2%	4.163	82,7%
Grade repetition Never (ISCED 1: Risced1_NEV)	dum	8.269	93,7%	4.839	96,1%
Grade repetition Never (ISCED 2: Risced2_NEV)	dum	8.401	95,2%	4.826	95,9%
Working hard on math hwk (wHRDhw_2)	dum	1.542	17,5%	1.417	28,2%
Studying hard for math quiz (studhq_2)	dum	1.876	21,2%	1.179	23,4%
Paying attention in (math) class (pyatt_2)	dum	2.953	33,4%	1.537	30,5%
Listening in (math) class (lstclass_2)	dum	3.545	40,2%	1.603	31,8%
Empowering in solving process (empsp_3)	dum	1.723	19,5%	484	9,6%
Talking to peers (math: mpeertk_3)	dum	2.492	28,23%	1.659	32,96
Helping peers (math: peerhlp_3)	dum	2.671	30,25%	1.605	31,89
A computer (used for school homework: comphm_1)	dum	8.562	96,98%	4.712	93,6%
Education software (school oriented: Edsfthm_1)	dum	3.581	40,56%	2.678	53,21
Computer linked to internet (educ use: wwwhm_1)	dum	8.634	97,79%	4.839	96,1%

Source: Own elaboration based on PISA2012 DATA. (*) T (type of variable), which can be continuous (C) or a dummy (D). Regarding the dummy variables, they taking the value 1 if characteristic holds and zero otherwise.

Variables describing students/learners competencies and technical characteristics are depicted in table 2. Regarding each learners background and general competencies (control variables), variables include gender, referred to boys (gender_M), the origin of students (native), if attending kindergarten for more than a year (kinder_more1), if students have not repeated any year in ISCED 1 (NorepISCED_1) and ISCED 2 (NorepISCED_2). All these variables are dummies, which take the value of 1 if the characteristic holds and 0 otherwise. One more variable has been included in this group, the student socioeconomic background index (SES), which is a continuous variable. This latter variable is an indicator that encompasses three components associated with the student's familiar and home environment, namely, (1) the level of parental occupation (job position), (2) the level of educational attainment of parents expressed in years of schooling and (3) the rate of student possessions at home. This last component in turn encompasses family welfare, cultural possessions and educational resources available in their homes, including the number of books.

The second and third group of learner's variables captures what we have called co-production abilities, which are related to student's behaviours and interactions between them. Regarding student behaviour, variables considered include those suggesting big effort of students at home, this is, working hard on math homework (wHRDhw_1) and studying hard for a math quiz (studhq_1). Moreover, variables considered relate students with in-class behaviour, such as paying attention (payatt_1) and active listening in math class (lstclass_1). Lastly, we have considered a variable related to student individual work in class which is deciding the method to solve math problems (empsp_1). As for the third group of variables capturing those abilities that involve student interactions, they include helping often their peers in math (peerhlp_2) and talking sometimes with peers about math (mpeertk_2).

As for learners' technical vector characteristics they include those technologies (in our case tangible) supporting students interactions out of school. Variables considered where if learners had a computer a home that can use for school work (comphm_1), if students had educational software installed (Edsfthm_1) and if they had a computer linked to internet (www_1).

Table 3. Providers Competence Vector Characteristics School Actors (Principals and Teachers).

Variables	T	FIN (N = 311)		KOR (N=156)	
		m/f	sd/%	m/f	sd/%
(Math) Teacher with major in Math (MT_majM)	cont	0,626	0,324	0,734	0,305
(Math) Teacher with ISCED 5A Pedagogy (MT_5aPED)	cont	0,325	0,428	0,231	0,291
TEACH formulating sch budget (TEACHq5b)	dum	7	2,25%	10	6,41%
TEACH deciding budget allocation (TEACHq6b)	dum	46	14,79%	43	27,56%
TEACH estab stud discip policy (TEACHq7b)	dum	148	47,59%	52	33,33%
TEACH estab stud assess policy (TEACHq8b)	dum	138	44,37%	88	56,41%
Teacher Enthusiasm (TCHenth_2)	dum	207	66,56%	99	63,46%
Teacher entrepreneurship (open new meth: TCHnewMet_2)	dum	198	63,67%	102	65,38%
Teacher behaviour/school climate (index: tchSCHclim)	cont	-0,08	0,81	0,08	1,12
Principal work towards school reputation (PRIreput_3)	dum	72	23,15%	52	33,33%
Principals work towards sch education goals (PRIeducG_2)	dum	125	40,19%	39	25,00%
PRIN estab teach starting salaries (PRINq3a)	dum	26	8,36%	11	7,05%
PRIN det salaries increase (PRINq4a)	dum	31	9,97%	6	3,85%
PRIN formulating sch budget (PRINq5a)	dum	118	37,94%	31	19,87%
PRIN deciding budget allocation (PRINq6a)	dum	271	87,14%	74	47,44%
Principal & teach particip sch-decision-mk (PTdecMak_4)	dum	112	36,01%	45	28,85%
Principal & teacher joint work - sch culture (PTculture_4)	dum	75	24,12%	50	32,05%

Source: Own elaboration based on PISA2012 DATA. (*) T (type of variable), which can be continuous (C) or a dummy (D). Regarding the dummy variables, they taking the value 1 if characteristic holds and zero otherwise.

Our second group of variables described are those associated to education providers (Teachers and Principals on the one side and Parents in the other). See Table 3. Variables considered can be associated to provider's competencies and co-production abilities (behaviours and interactions). Variables associated to teachers competencies and knowledge are the percentage of math teachers with a major in math (MT_majM) and the percentage of math teachers with an ISCED 5A in pedagogy (MT_5aPED). These first sets of variables are continuous. Regarding teachers co-production abilities (behaviour and interactions), variables include empowered teachers in the domains resource management (TEACHq5b and TEACHq6b, where teachers have the responsibility for planning and allocating resources) and organisation of instruction (TEACHq7b, TEACHq8b, TEACHq9b and TEACHq10b, where teachers have responsibility of disciplinary, assessment and admission policies including textbook choosing). Further, variables include enthusiastic teachers (TCHenth_1) and teachers interested in trying new methods and teaching practices (TCHnewMet_1). All variables considered in this second set are in general dummies, taking the value of one if the characteristic holds and zero otherwise.

Moreover, we have considered the index of teacher-related factors affecting school climate (tchSCHclim), which integrates a set of responses¹⁹⁰ from principal on how school climate can hinder student learning. It is a continuous variable where positive values reflect principals' perceptions that these teacher-related issues hinder learning to a lesser extent, and negative values indicate that school principals believe that these teacher-related issues hinder learning to a greater extent, compared to the OECD average (OECD, 2013).

¹⁹⁰ The main concern of the index was to consider how important some school factors (Q.18 of the paper questionnaire and SC22q01 to q19 of the school PISA2012 data base) such as students not being encouraged to achieve their full potential; poor teacher-student relations; teachers having to teach students of heterogeneous ability levels within the same class; teachers having to teach students of diverse ethnic backgrounds within the same class; teachers' low expectations of students; teachers not meeting individual students' needs; teacher absenteeism; school staff resisting change; teachers being too strict with students; teacher being late for classes; and teachers not being well-prepared for classes have the potential to hinder student learning (OECD, 2013, Volume IV, 175).

Table 4. Providers Competencies External Actors (Parents).

Variables	Type	FIN (N = 311)		KOR (N=156)	
		m/f	sd/%	m/f	sd/%
Parents volunteer - extracurricular activities (PARextCV)	cont	6,16	13,64	6,77	14,18
Parents assisted teacher in school (PARassTCH)	cont	0,52	2,32	5,69	12,06
Parent participated in local school government (PARsgb)	cont	5,27	9,65	13,27	21,62
Parent discusses - child behaviour - own initiative (PARbehOWN)	cont	24,54	24,81	25,35	25,34
Parent discusses - child behaviour - Teacher initiative (PARbehTCH)	cont	44,62	33,50	45,95	38,90
Parent discusses - child progress - own initiative (PARprogOWN)	cont	27,94	23,96	29,30	26,09
Parent discusses - child progress - Teach initiative (PARprogTCH)	cont	55,69	33,81	47,68	38,02

Source: Own elaboration based on PISA2012 DATA. (*) T (type of variable), which in this case are continuous (C).

As for Principals, behaviours variables considered include empowered principals in the domains of human resources (prin3b and prin4b, having the responsibility over teacher's salaries) and resource management (prin5b and prin6b, having responsibility for planning and allocating resources). Regarding principals' interactions, variables considered namely targeted principals' abilities to joint work namely with faculty members and teachers, by empowering teachers-co-decision on decision making (PTdecMak_4) and for improving school culture (PTculture_4). Parents¹⁹¹ (as well as external actors) normally participate in education services (schooling) by supporting teachers (active participating on student activities by providing specialized knowledge, technical support, resources or assist teachers (and students) in their daily work) as well as becoming highly involved in the development of schools (becoming part of school advisory or governing board or Parent-Teacher Associations, or even supporting administrative or school maintenance tasks) in order to improve school services. Variables considered for parents (Table 4), deal with their interactions (with the rest of providers), namely with teachers. The set of variables include, the percentage of parents discussing with the teacher by own (PARbehOWN) or teacher initiative (PARbehTCH) child behaviour and child progress (PARprogOWN and PARprogTCH), the volunteering in extracurricular activities (PARextCV), assisting teachers teaching (PARassTCH) or participating in local government (PARsgb). Variables are depicted in table 4.

¹⁹¹ Given that parents play a relevant role at home and school, and given the empirical strategy we used (HLM), we considered that parents' specific characteristics – e.g. education level, job status (including time availability effect captured by parent working full or partially or not working status) or even parents' origin - must come associated at "student level" as they impact students outcomes by interacting with their children out of school. Further, those characteristics (namely interactions) of parents at school (e.g. parent participating in extracurricular classes or assisting teachers at school or even participating in Governing Boards), should be considered as school resources, as their impact have the potential to benefit the student (and school) bodies. The former individual parent characteristics (affecting student resources) have been included in the student SES indicator (which include as mentioned before, parents education attainment level and job position). The latter are those presented in Table 4, which include (and assumes) parental participation in school, suggesting potential effects over students. In any case, aggregated parental characteristics at school level of those parents actively participating in school activities (been these related to instruction or school development), can also be considered as school resources.

*Table 5. Providers Technical Vector Characteristics
School Actors (Principals and Teachers).*

Variables	Type	FIN (N = 311)		KOR (N=156)	
		m/f	sd/%	m/f	sd/%
Standardize (math) curriculum (StdMTHcv_1)	dum	205	65,9%	132	84,6%
(Math) Similar cont & different levels (simCNTdifLVL_2)	dum	101	32,5%	77	49,4%
(Math) NO abg & adpt pedag in-class (NOabgADTped_2)	dum	106	34,1%	80	51,3%
Ability grouping (None ABG_1)	dum	103	33,1%	17	10,9%
Sch offers extra math lessons (adMATles_1)	dum	180	57,88%	141	90,38%
Purpose of extra math less_ENRICH (PURadMATles_1)	dum	4	1,29%	3	1,92%
Purpose of extra math less_REMED (PURadMATles_2)	dum	95	30,55%	21	13,46%
Purpose xtr math les_ENRICH&REM (PURadMATles_3)	dum	105	33,76%	118	75,64%
Purpose of extra math less_NOdif (PURadMATles_4)	dum	11	3,54%	8	5,13%
Desktop avail sch & use it (aDKtCOMP_1)	cont	0,811	0,147	0,383	0,219
Laptop avail sch & use it (aLapTOP_1)	cont	0,323	0,304	0,086	0,091
Tablet/Ipad avail sch & use it (aIPAD_1)	cont	0,047	0,121	0,023	0,040
Internet avail sch & use it (awwwSCH_1)	cont	0,847	0,114	0,474	0,227
Computers linked to internet (index: compWEB)	cont	0,997	0,03	0,974	0,09
Quality of buildings and spaces (index: QUALphysST)	cont	-0,298	0,990	-0,178	0,931
School type Index (SHtype_1 PUB)	dum	290	93,2%	85	54,49%
Student-teacher ratio: Stratio	cont	10,38	2,08	16,22	3,79

Source: Own elaboration based on PISA2012 DATA. (*) T (type of variable), which can be continuous (C) or a dummy (D). Regarding the dummy variables, they taking the value 1 if characteristic holds and zero otherwise.

Lastly, we present the technical characteristics of education service (Table 5). We refer to resources implemented at school level which normally allow "providers interact and are considered as interfaces": In this last group of variables we have those related to school content, considering if the school uses a standardize curriculum in math (StdMTHcv_1) and if implements similar content in different levels in some classes (simCNTdifLVL_2). Moreover, variables dealing with methods and organisation, includes no ability grouping and using adaptive pedagogy in some classes (NOabgADTped_2) and the index of ability grouping (ABG_1), this is, "no student grouping" either in class or within school. Two more variables are included in this subgroup, if schools offer extra math lessons (adMATles_1) and the purpose of these lessons, enrichment (PURadMATles_1) or remedial (PURadMATles_2). Regarding school resources we have considered those related to ICTs. For these group of variables we have consider not only the availability of specific devices at school but also their effective use by students, variables considered include a desktop computers (aDKtCOMP_1), laptops (aLapTOP_1), tablets or Ipad (aIPAD_1) and internet access (awwwSCH_1). Other variables considered where the ratio of computers liked to internet per student (compWEB) and as well as the index of quality of buildings and spaces (QUALphysST). This latter variable integrates variables related to school buildings and instructional spaces (Q.11 of the school questionnaire/SC14 of the school PISA2014data). Last, variables considered have been those labelled as traditional (or monetary controlled) by the mainstream literature, this is, class size (Csize), school type or structure (SHtype_3) and student-teacher ratio (STratio).

4 Methodology and Empirical Strategy.

The technique employed where two level hierarchical linear models (HLM¹⁹²). The consideration of this technique is based on the nested nature of the data used (PISA-2012 DB), where students are nested into schools, and schools in regions/countries, which properly accounts for the multilevel structure of the dataset and is useful to analyse the performances at different levels (e.g. student-level, school-level, etc.) while controlling for the variance across levels (Hox, 2002, Chapter 1). Furthermore, this technique has been considered in several studies in education (e.g. Bryk et al.,1993; Bryk and Raudenbush, 1988; Raudenbush, 1988; Calero and Escardíbul, 2007; Mancebón et al.,2010; Calero et al.,2009).

These grouping effects (nested data), suggest that the interaction between students of the same group are more similar than those of students in different groups, thus interaction between students in the same group cannot be considered statistically independent, violating the independent noise hypothesis. Hence, using traditional statistical

¹⁹² For building and running our modeling strategies we have used STATA V.13 software.

methods such as regressions or ANOVA¹⁹³ to analyze this type of data are not entirely applicable (Goldstein, 1995/1999; Raudenbush and Bryk, 2002; Hox, 2002). In fact, failure to recognize the hierarchical nature of data, could lead to unreliable estimates regarding the effectiveness of school characteristics and practices, which could lead to unfounded policies or practices (Raudenbush and Brick, 2002). Therefore, the use of hierarchical linear models appears to be the most appropriate statistical technique for treating nested data.

HLM displays different sub-models for each level of the data structure. These sub-models in turn capture the relationship between the variables at the same level, as well as the influence of higher-level variables on variables at lower levels.

In our case, following our theoretical construct¹⁹⁴, the general hierarchical linear model we implement in matrix notation is as follows:

$$(I) \quad Y = Z\gamma + X\beta + R\mu + \varepsilon$$

Where Y (the dependant variable) is the $n \times 1$ vector representing the education outcomes (student test scores), X is the $n \times p$ covariate matrix representing the learner (student level) characteristics and Z is the $n \times q$ covariate matrix of education providers (at school level) characteristics. Further, R is $n \times p$ covariate matrix for the random effects μ and ε represents the $n \times 1$ vector of individual errors, which we assume to be multivariate normal with mean zero and variance matrix $\sigma_\varepsilon^2 D$. γ , β and μ are the $n \times 1$ vectors of parameters to be estimated in the model.

Twelve models have been build (the null and the complete models for each literacy domain for each country sample) of which, the last six models address our research questions stated in section 1 of this paper. We followed a consolidated tradition in the applied statistics literature about student-level/school-level data, for which predictors have been included cumulatively (by level and set of variables), over the "null model" which has been considered our baseline specification (e.g. Lamb & Fullarton, 2001; Dronkers & Robert, 2008). The estimation approach (suitable for case analysis) has been made separately from a case-to-case approach.

The first six models are the null models for each literacy domain for each case (Finland and Korea), which considers only the dependent variable (math, science and reading student test scores, Y). This type of model is the indicator of the variability associated with the different levels involved in the analysis, and therefore serves as a reference for testing the goodness-of-fit of successive models.

The null model specification in levels (for each of the literacy domains of both countries analyzed) is as follows:

$$\text{Level 1:} \quad Y_{ij} = \beta_{0j} + \varepsilon_{ij} ; \text{ where } \varepsilon_{ij} \sim N(0, \sigma^2)$$

$$\text{Level 2:} \quad \beta_{0j} = \gamma_{00} + \mu_{0j} ; \text{ where } \mu_{0j} \sim N(0, \tau_{00})$$

In level 1, we observe how the test scores of student i in school j¹⁹⁵ is explained by the average achievement of school j (β_{0j}) and the individual error of student i in school j (ε_{ij}). In level 2, we observe how the average achievement of school j is explained by the overall mean of schools means (γ_{00}) and the school error term (μ_{0j}). In addition this first model also provides estimates for the variance of the student error (σ^2) and for the variance of the school level error (τ_{00}), which in turn can be used to determine how much of the total variance is accounted for by students and schools.

Our second group of models (the last six models), take into account learners (student level) and providers (school level) characteristics. The model is specified as a random intercept model considering multiple covariates from level 1 and level 2.

The variable intercept specification in levels is as follows:

$$\text{Level 1:} \quad Y_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + \varepsilon_{ij} ; \text{ where } \varepsilon_{ij} \sim N(0, \sigma^2)$$

$$\text{Level 2:} \quad \beta_{0j} = \gamma_{00} + \gamma_{01}Z_j + \mu_{0j} ; \text{ where } \mu_{0j} \sim N(0, \tau_{00})$$

In Level 1 these group of models shows how the test score of student i in school j is explained by the average achievement of school j, the set of characteristics (competencies and technical characteristics) of student i in school j and the individual error term of student i in school j. Level two, shows how the average achievement of school j (the

¹⁹³ Analysis of Variance.

¹⁹⁴ We must emphasize that we have taken into consideration the production function approach (Hanushek, 1986, Levin, 1971, 1994) as well as its "particular" considerations when specifying this type of functions in education (Boardman and Murnane, 1979; Todd and Wolpin, 2003), when building-up our model (specifying the set of variables used between students/learners and providers at student level and those considered at school level).

¹⁹⁵ Formally, the first level shows that the performance of student i in school j is determined by the average student performance of school j and the individual error ε_{ij} , of student i in school j. We assume this error has mean zero and constant variance σ^2 , which is to be estimated. The second level shows that the average school performance of school j is determined by the overall performance of the schools (mean of school means) and school j random effect (or residual μ_{0j}). This residual μ_{0j} is assumed to be independent of the individual error term ε_{ij} . The subscripts i and j refer to each of the students (where $i = 1 \dots n$) and each of the schools (where $j = 1 \dots k$), respectively.

β_{0j} intercept) is explained by the (overall) mean of schools means, the school j (providers competencies and technical characteristics) general characteristics in school j and school j error term (μ_{0j}).

A more comprehensive reference for the statistical theory behind and a detailed methodological approach to hierarchical linear models (or multilevel models), can be check in Raudenbush and Bryk (2002) and Goldstein (1995 and 1999), including Hox, 2002.

5 Results and Discussion

Results achieved are presented in tables 6 to 9. For each country analysed we present three models, one for each education outcome (literacy domains in math, reading and science). Regarding the null models (Table 6), we observe that the overall average performance (γ_{00}) for each literacy domain in both countries/cases, are statistically different from zero and show positive values. Scores achieved are 507,5; 511,1 and 528,2 points and 551,1, 533,9 and 535,8 points for the math, reading and science domains of each case. Furthermore, for all models, statistically significant differences exist as first-level variance (σ^2) and second level random effect (τ_{0j}) clearly rejects the maximum likelihood contrast ($p < 0.01$) where the null hypothesis¹⁹⁶ assumes that both variations are (the same and equals) zero.

Table 6. NULL MODEL – Random Effects and Model's Fit Statistics.

NULL MODEL	FINLAND			KOREA		
	Math	Reading	Science	Math	Reading	Science
Constant (γ_{00})	507,514	511,101	528,175	551,075	533,886	535,778
Random Effects-Parameters						
Intercept (τ_{0j})	951,23	1.235,64	1.238,98	3.864,57	2.779,44	2.448,97
Residual (σ^2)	7.129,23	8.893,29	8.772,35	5.991,44	4.825,34	4.310,25
TOTAL	8.080,46	10.128,93	10.011,33	9.856,02	7.604,78	6.759,22
Model Fit Statistics						
ICC (Second Level)	11,77%	12,20%	12,38%	39,21%	36,55%	36,23%
LR test vs Linear Reg (χ^2 Sq)	579,96***	645,37***	647,62***	2.023,5***	1.821***	1.799,5***
Deviance (2 x min Likelihood)	103.853,30	105.814,64	105.697,77	58.531,86	57.425,95	56.855,75
AIC	103.859,30	105.820,64	105.703,78	58.540,76	57.431,95	56.861,75
BIC	103.880,56	105.841,88	105.725,02	58.557,43	57.451,52	56.881,32

P-values: *** $p < 0,01$; ** $p < 0,05$; $p < 0,1$

These facts supports that the intraclass correlation coefficient (ICC) is likewise significant, indicating the pertinence and need of multilevel modelling of our data. In the case-to-case analysis we can see how for each literacy domain, Finnish ICC's reaches the values of 11,7%, 12,2% and 12,4 respectively. Likewise for Korea, ICC's reach the values of 39,2%, 36,6% and 36,2% respectively. This means that the 11,7%, 12,2% and 12,4% of Finland's and the 39,2%, 36,6% and 36,2% of Korean's variance of the average math, reading and science literacy domains performance of learners is due to differences between schools. When analyzing more in detail each of the countries ICC's, we observe that on average they vary considerably between countries, being higher in the case of Korea (for each literacy domain). Seen this situation from a different perspective¹⁹⁷, we can say that differences within schools (within any group) are higher in Finland (the highest) than in Korea.

Moreover, the deviances for each case are, 103.853,3 ; 105.814,64 and 105.697,77 for each literacy domain in Finland, and 58.540,76; 57.431,95 and 56.861,75 for Korea. If not needed at this stage of the analysis their value sets each model's baseline, which will help us test the goodness-of-fit of successive models when additional predictors are included which are supposed to reduce significantly this indicator. In summary, regarding the null model for each of the literacy domains in each country (six models), we can see the need for multilevel modelling given the data used.

Regarding the fixed effects, table 7 shows the results for the case of Finland and table 8 presents the results for the case of Korea. This distinction has been made to clearly identify the influence of actors' competencies and technical characteristics over different educational outcomes for each country. To prevent possible misspecification errors we have also included control variables related to student socioeconomic background, gender and geographic origin variables..

Therefore, regarding the Finnish case (Table 7), we observe that in general (except for the learners technical characteristics), learner's and provider's competencies and co-producing abilities and technical characteristics influence all three literacy domains, as some characteristics (for each literacy domain) are statistically different than zero and

¹⁹⁶ Statistically we consider a LR-type contrast, such that $H_0: \sigma^2 = \tau_{00} = 0$

¹⁹⁷ ICC for school level is computed as the ratio between level 2 variance (schools) and the sum of level 1 and level 2 variance (schools and students). This means in our model $ICC_{sch} = V(\tau_{00}) / [V(\sigma^2) + V(\tau_{00})]$

show positive and negative effects. This means that in general there is a set of competencies and technical characteristics that influence a set of education outcomes, measures as student test scores in the domains of math, reading and science.

By characteristics vectors, learner's competencies and co-producing abilities include knowledge and abilities (learnt) as a consequence of attending kinder for more than 1 year (Att_Kinder) and never repeating a grade (ISCED 1), being responsible with their own learning (studying hard for math quiz's - studhq - and paying attention in math class - payatt) and supportive with their peers (helping their peers with a subject - peerhlp). The rest of abilities analysed (highlighting empowered students in problem solving, talking with peer's about a subject, small group working or group working using a computer) influence differently or have not influence at all over each student outcomes (different literacy domains), as some of these variables are statistically different than zero and show positive or even negative effects over different literacy domains. Regarding the technical vector of learners, students having a computer (comphm_1) in their house for school purpose is statistical different than zero and show positive effects for the domains of reading and science but have no effect over the math domain.

Regarding the provider's competencies & coproducing abilities and technical characteristics, we must say that except for those co-producing abilities relating the joint-working of principals and teachers aimed at building a school culture (once a month) and the technical characteristic of specific class size, in general, the pattern observed is that of some variables being statistically different than zero and showing positive or negative effects over specific (but different) outcomes (one or two literacy domains) and other variables show no effects at all. Highlight the relevance of (math) teachers with an ISCED5A degree over reading and science test scores, the role of empowered teachers in budget allocation and principals in establishing teachers starting salaries over math test scores on the one hand, and the impact of the availability (and use) in schools of technology, desktops computers and laptops over math test scores and internet access availability over reading and science test scores on the other.

Table 7. HLM2 Results for Finnish Sample (Outcomes).

Variables	Math	Reading	Science
Constant (γ_{00})	281,02***	162,387***	176,89***
Student Socioeconomic Status (ses)	20,208***	19,304***	20,37***
Gender (Boys)	9,931***	-51,970	-6,19***
Native (native)	39,453***	51,382***	61,84***
Att Kinder 1 year or more (ISCED 0: kinder_more1)	10,67***	13,32***	11,24***
Grade repetition Never (ISCED 1: Riscd1_NEV)	41,33***	42,67***	51,09***
Studying hard for math quiz (studhq_4)	9,67***	8,64***	12,47***
Paying attention in (math) class (pyatt_1)	22,99***	18,43***	21,50***
Listening in (math) class (lstclass_1)	7,113**		
Empowering in solving process (emsp_3)		4,62**	
Helping peers (math: peerhlp_2)	26,68***	15,20***	20,08***
A computer (used for school homework: comphm_1)		20,11***	20,98***
(Math) Teacher with ISCED 5A (MT_ISC5A)		52,67***	50,16***
PRIN estab teach starting salaries (PRINq3a)	10,51**		
TEACH deciding budget allocation (TEACHq6b)	-5,38*		
Principal & teacher joint work - sch culture (PTculture_4)	-7,16**	-8,47**	-10,76***
(Math) Similar content & different levels (simCNTdifLVL_2)	-4,97*		
Desktop avail sch & use it (aDKtCOMP_1)	45,65***		
Laptop avail sch & use it (aLapTOP_1)	13,27**		
Internet avail sch & use it (awwwSCH_1)		76,03***	80,37***
Class size (Clsize)	0,82**	1,62***	1,98***

P-values: *** p<0,01; ** p< 0,05; p< 0,1

We focusing in the common (or core) competencies and technical characteristics influencing all outcomes (literacy domains), we observe that learner's competencies and co-producing abilities play key role in contrast to provider's competencies and technical characteristics. This consideration suggest that students co-producing abilities play a key

role over all set of outcomes (all domains), but individual provider's competencies/co-producing abilities and technical characteristics play specific roles over different (but individual) outcomes (literacy domains).

Shifting our analysis to the Korean case (table 8), general results achieved likewise show that student's and provider's competencies/co-production abilities and technical characteristics influence all set of outcomes (literacy domains). But more interesting and in contrast to the Finnish case, is that all vectors of all actors have common (or core) competencies and technical characteristics influencing all outcomes. These results suggest that Korean education provision is arranged in a way that more competencies and technical characteristics target a wider set of education outcomes.

More in detail analysing each vector, we observe for the learner's competencies and co-producing abilities some specificities. Abilities (and attitudes) include student engagement and responsibility with their own learning (paying attention in math class - payatt) and with their peers (helping their peers with a subject - peerhlp) which are statistically different than zero and have positive effects over each literacy domains. Moreover, student's technical vector becomes relevant as having a computer at home (comphm), with an education software (edsfthm) and a link to the internet (wwwhm) for school purpose becomes statistically different of zero and shows positive values over all education outcomes (literacy domains).

Table 8. HLM2 Results for the Korean Sample.

Variables	Math	Reading	Science
Constant (γ_{00})	277,17***	304,86***	285,79***
Student Socioeconomic Status (ses)	9,518***	6,684***	4,297***
Gender (Boys)	11,58***	-27,67***	
Native (native)	48,13***	31,971**	31,899**
Att Kinder 1 year or more (ISCED 0: kinder_more1)	7,49***	7,14***	
Grade repetition Never (ISCED 1: Riscd1_NEV)	23,73***		
Grade repetition Never (ISCED 2: Riscd2_NEV)		20,968***	26,04***
Working hard on math hwk (wHRDhw_2)	11,29**	11,759***	
Studying hard for math quiz (studhq_1)	12,47**		6,55***
Paying attention in (math) class (pyatt_1)	13,7***	9,378***	17,80***
Empowering in solving process (empsp_4)			10,22***
Helping peers (math: peerhlp_2)	25,38***	10,405***	17,38***
A computer (used for school homework: comphm_1)	10,74**	16,75***	14,93***
Education software (school oriented: Edsfthm_1)	6,37***	6,73***	6,57***
Computer linked to internet (educ use: wwwhm_1)	32,26***	25,36***	24,08***
TEACH formulating sch budget (TEACHq5b)		-28,05**	
TEACH estab stud discip policy (TEACHq7b)		15,57**	
Teacher Enthusiasm (TCHenth_1)	13,84*	16,61**	
Teacher behaviour/school climate (index: tchSCHclim)			5,91**
PRIN formulating sch budget (PRINq5a)	32,95***	29,2***	23,65***
Principal & teachers particip sch-decision-mk (PTdecMak_1)			75,98***
Parent discusses - child progress - own initiative (PARprogOWN)	0,53***	0,364***	0,38***
Same (math) textbooks (SAMEtxbksM_2)	24,47**	25,28***	22,75***
(Math) ability grouping within classes (ABGwthCLASS_3)	16,71**	13,67**	12,75**
Purpose xtr math les_ENRICH&REM (PURadMATles_3)	39,58***	27,01***	39,39***
Quality of buildings and spaces (index: QUALphysST)			-5,65*
Laptop avail sch & use it (aLapTOP_1)	67,73*	62,08*	

P-values: *** p<0,01; ** p< 0,05; p< 0,1

Regarding the provider's competence and co-producing abilities mention the relevance of empowered principals when formulating school budget (PRINq5a) as well as parent's interest in their child's progress (PARprogOWN) becomes relevant over all outcomes. This variable captures parent's discussion with teachers of child progress by own initiative.

Last regarding the technical vector (associated to providers), we observe that not using the same (math) textbooks in every class (SAMEtxbksM_2), the non existence of ability grouping within (math) classes (ABGwthCLASS_3) and the

existence of extra classes of math for enrichment & remedial purpose (PURadMATles_3) show positive effects over all outcomes (literacy domains).

Table 9. COMPLETE MODEL - Random Effects and Model's Fit Statistics.

OVERALL MODEL	FINLAND			KOREA		
	Math	Reading	Science	Math	Reading	Science
Random Effects-Parameters						
Intercept (τ_{0j})	248,82	537,54	499,36	1.444,10	1.067,06	1.002,15
Residual (σ^2)	4.858,28	5.907,75	6.105,82	5.257,41	4.153,82	3.836,68
TOTAL	5.107,11	6.445,30	6.605,18	6.701,51	5.220,87	4.838,83
Model Fit Statistics						
Wald Chi 2 (34)	4.560,2***	4.658, 9***	4.099,2***	945,8***	1.043,2***	830,4***
LR test vs Linear Reg (χ^2 Sq)	152,16***	353,68***	309***	733,34***	684,17***	690,4***
Deviance (2 x min Likelihood)	100.117,50	101.975,16	102.237,49	57.581,68	56.383,97	56.017,40
AIC	100.191,52	102.039,16	102.303,48	57.647,68	56.451,97	56.077,40
BIC	100.453,68	102.265,92	102.537,34	57.862,96	56.673,78	56.273,12
Proportion Explained						
Schools	73,84%	56,50%	59,70%	62,63%	61,61%	59,08%
Students	31,85%	33,57%	30,40%	12,25%	13,92%	10,99%
Total (R2)	36,80%	36,37%	34,02%	32,01%	31,35%	28,41%

P-values: *** $p < 0,01$; ** $p < 0,05$; $p < 0,1$

Finally, highlight that the random effects (see Table 9) in all cases - the Finnish and Korean samples - are statistically significant, as we reject the null hypothesis of the maximum likelihood contrast of variances being zero. Moreover, when analyzing the goodness of fit of each model, it's worth mentioning two issues. First, comparing the deviance in all cases (100.117,50 ; 101.975,16 and 102.237,49 for each domain in Finland, and 57.581,68, 56.383,97 and 56.017,40 for each domain in Korea), we see that all deviances¹⁹⁸ have been reduced in comparison with each case null models, as different predictors/covariates have been included. Second, we observe that the proportion of variance explained at schools level for the Finnish case is able to explain more than a 55% of all literacy domains and for Korea more than the 60% for each literacy domain.

To this end, following our research hypothesis we can conclude that in general all set of technical characteristics and actors competencies not always influence all education outcomes (test scores in the domains of math, reading and science), but there are some core (or common) technical characteristics and competencies that do influence all outcomes. Our results show that for Finland, core characteristics influencing all outcomes (for each domain) have to deal with student competences and co-production abilities. As for Korea, surprisingly, core (or common) characteristics influencing all outcomes belong to the students and provider's competencies/co-production abilities and technical characteristics of both student's and providers. In this context of common characteristics, we can mention a key role of competencies and co-production abilities of student's in the case of Finland. As for Korea, surprisingly, technical characteristics (including ICTs), and competence/co-producing abilities play a key role. In any case, we must emphasise that some specific technical characteristics or actor competences and co-producing abilities play a relevant role (given their effect size), over some specific outcomes. Highlight that in Finland, technical characteristics (including ICTs) play an important role in some education outcomes.

6 Final Remarks and General Conclusions

From an empirical point of view, we have analyse the extent to which the same set of technical characteristics and competences influence several education outcomes (as measured by the PISA2012 math, reading and science test scores) in two top performer countries, Finland and Korea. Further, given the fact that different ways to provide education are equally effective in terms of performance and equity, our research has address the role of technical characteristics and competences in the two cases analysed.

Results suggest that human resources (competencies) and technology (technical characteristics) influence all set of student outcomes in both cases analysed. Nevertheless, when focusing on core (common) actor competences and technical characteristics influencing the overall set of outcomes (math, reading and science test scores) in Finland student competences and technical characteristics (engagement and responsibility in their own and peer learning) play a

¹⁹⁸ It concerns the complete models, which are sensible lower than the null models for each case.

key role. As for Korea, surprisingly, learner's and provider's competences and technical characteristics of both, learner's and provider's become relevant.

More in detail - over these core characteristics – for the Finnish case, trained teachers and empowered principals, student engagement and responsible class attendance and the use of ICTs at school show positive effects over all outcomes. In the case of Korea student engagement with school, the use of ICTs' for school work, empowered principals and parental interest/support show positive effects over all outcomes domains. Hence, human and technology play a key role in education.

Having in mind that educational systems (and countries) are different given their social and cultural characteristics, our research suggest that by better understanding how education is provided, and more important, identifying for each case the core characteristics underpinning education outcomes, field for policy measures (and innovation) aiming to improve education outcomes is placed. In any case, further research must be encourage.

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ANNEX I: Particular Cases of Education Provision-Delivery

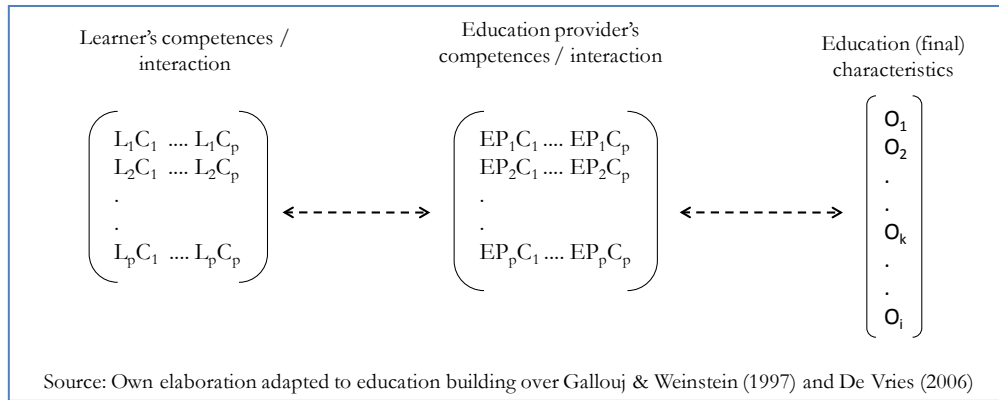


Figure 2. A Pure Education Service (e.g. Teacher explanation).

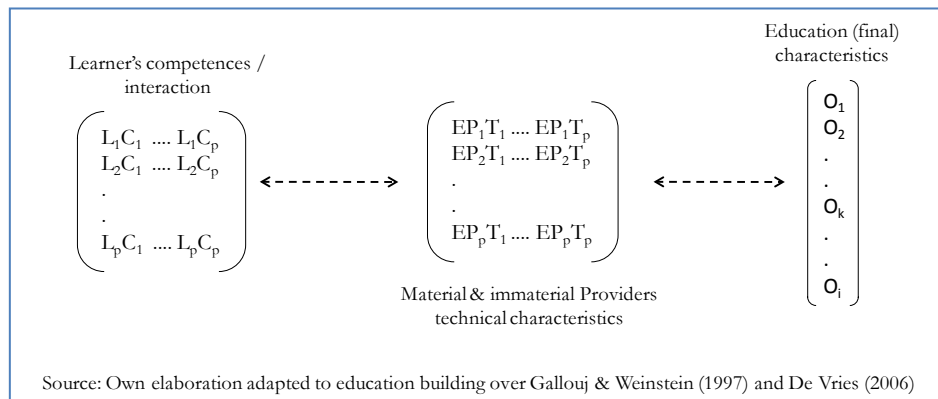


Figure 3. A Pure Material Good (e.g. Reading a chapter textbook).

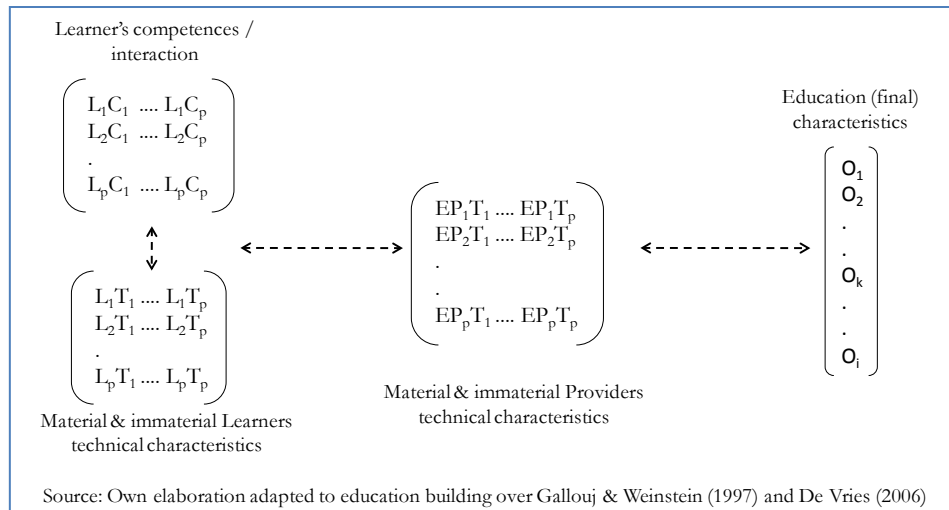


Figure 4. Education Self-service (e.g. Downloading & reading education content).

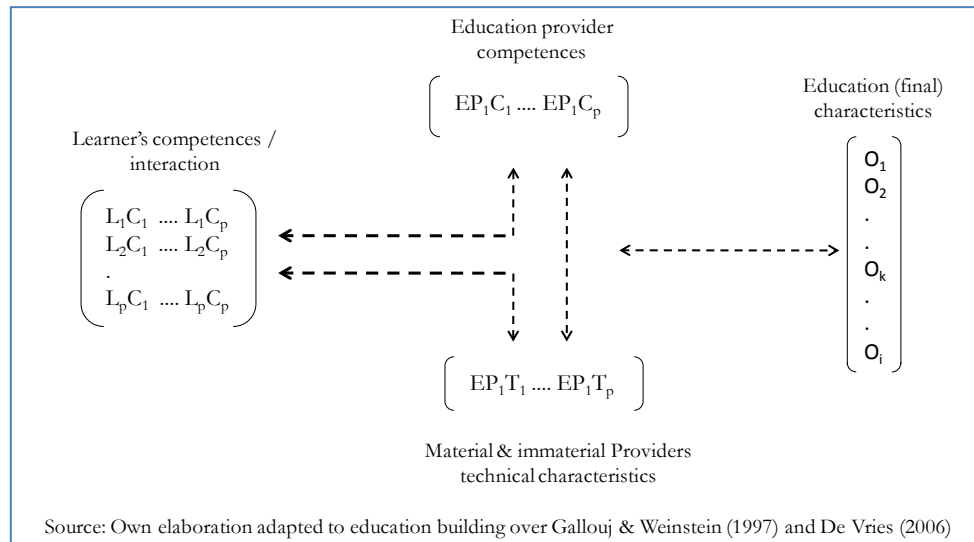


Figure 5. Traditional teacher-centred class.

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Service Innovation as a research theme: where 30 years of work have brought us?

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This paper maps the evolution of the service innovation field of study over the last 30 years (1984-2014) by examining the content of 209 selected research papers and by constructing ten thematic categories later tested on a Multiple Correspondence Analysis - MCA. Frequencies for each category in temporal perspective show emerging and declining issues. We highlight top publishing journals and authors as well as top cited papers. Although recent, the service innovation field of study has issues of greatest expression (Performance, Sectorial analyses and Innovation efforts) and of lower expression (R&D, Public sector and Theoretical advances and modelling).

Introduction

This paper aims to map the evolution of the service innovation field of study over the last 30 years (1984-2014). To achieve such goal, this work carries on a large research by accessing open databases and directories in search of published papers related to the major theme of service innovation. The present work seeks to contribute to the understanding of the historical trajectory of the research theme as well as to point out future tendencies for the upcoming researches.

The service innovation theme has been highly described as recent and emerging over the last couple decades. Most of the literature around the theme states the works of Barras (1986; 1990) as the starting point for the study of service innovation. Since this first research effort, taken 28 years ago, many others contributions have been given to the major theme of service innovation. In the present moment, the innovation theory seems to have arrived to a point of no return at which we do recognize two postulates as true: services do constitute a major field of research in present times of “service economy” (Rubalcaba, 2007), from which we even derive service science themes; and service innovation is a consistent research field, having experienced advances in terms of theoretical propositions, modelling and testing. Therefore, after almost three decades of work, one major question emerges: where do we stand in terms of evolution concerning the service innovation research theme? We believe the answer to this particular question may be stated by splitting it into some minor research inquiries. Therefore, we state the two following inquiries: what are the majors research themes explored in service innovation and how do they relate to each other over time? And: which authors and journals have contributed more and which particular works have achieved higher degree of diffusion in the service innovation theme along the last 30 years?

The answer to these two minor questions requires methodological tools fitted well enough to support the mapping of a research theme along three decades. When searching for useful methods for such task, we came across many valuable literature reviews that showed a wide range of bibliometric procedures applied to different fields of research. One work in particular stood out in this search: the methodological work of Furrer, Thomas and Goussevskaja (2008). The authors have conducted a research in order to map the evolution of the strategic management field on 26 years of research by collecting published papers from the mentioned research field. After selecting the appropriate papers, the authors have built a database considering specific bibliometric data. They have performed a content analysis on the papers original keywords to constitute derived research themes therefore treated as variables in a statistical analysis called MCA – Multiple Correspondence Analysis. Such multivariate technique allowed the researchers to identify the correlations established among the constituted variables at a given time and, therefore, to map the evolution of the research themes within a period.

Although there are disparities between the original research field explored by Furrer et al. (2008) and the service innovation field, we assumed that the techniques deployed by late authors could represent a good starting point to map the trajectory of studies on the service innovation theme. Thus, this work traces its methodological lines from the mentioned work and adopts changes whenever necessary given the nature of the present research theme. Having the methods previously stated, the answer to the first minor inquiry - what are the majors research themes explored in service innovation and how do they relate to each other? – is given by examining the content of a large amount of selected research papers published on open source journals and constructing ten macro-themes later tested on an MCA analysis. Frequencies for each macro-theme are presented in temporal perspective, allowing us to identify emerging or declining issues. The second minor inquiry - which authors and journals publish more and which particular works have achieved higher degree of diffusion in the service innovation theme along the last 30 years? – is answered by showing the most popular journals publishing on the theme and the most cited authors and papers along the period. Additionally, this paper also shows the ten most widespread works and how they represent the major research themes.

The analyses presented in this paper are carried on a database constructed by authors by collecting bibliometric data from selected papers published from 1990 to July 2014. As we expected to assemble the largest possible amount of papers, we have mobilized the following multiple research directories: Annual Reviews, Oxford Journals, Science

(AAAS), Scielo, Cambridge Journals Online, SpringerLink, JSTOR Arts & Sciences III Collection (Social Sciences), Academic Search Premier - ASP (EBSCO), Directory of Open Access Journals – DOAJ, SAGE, ScienceDirect (Elsevier), Emerald Fulltext (Emerald) and Proquest – ABI Inform Global. The construction of this particular list of directories took into account some of our search options to be presented: a) rather than individual journals, only search directories were taken into account in order to prevent a journal from being privileged over another in selection procedures, so that all journals gathered in the directories had the same chance of appearance in this research; b) since this research intended to show the level of diffusion of individual papers according to their number of citations, we have chosen not to adopt selection criteria based on journals impact factor; c) only free access directories were considered on this basis.

Having the directories list set up, it was time to define which keywords would be used for research. Initially, two terms were chosen: "Innovation in services" and "service innovation". The first searches, however, showed that those key-words would not answer the inquiries we had previously established. The search for "innovation in services" brings as result a huge amount of papers that perform researches on service activities eventually citing the term innovation - which did not meet our expectations of selecting papers that discuss service innovation instead of casually mentioning an innovation in a service. Since this research aimed at selecting papers that discuss the phenomenon of innovation mobilizing theoretical argument related to the reality of services, the use of keywords combination "Innovation in services" showed itself to be unsuitable. Therefore, the research was carried on using "service innovation" as keyword.

The initial amount of papers on the selected directories consisted of 3045. A subsequent selection has been performed on such amount by adopting new discard criteria: a) every paper duplicity was eliminated; b) whenever possible, the search mechanisms were programmed to result in more specific searches, focusing on social sciences, but that was not always the case, so the use of the word "services" led us to find a multitude of papers from distant areas that had their own meanings for "services" - medicine, history, agronomy - and which subsequently had to be discarded, leaving us only social sciences papers; c) only papers that discuss, test or map service innovation were kept. Many papers that only mentioned the word innovation were discarded. Such procedure allowed the exclusion of papers that casually mentioned the word innovation - often as a synonym for change or novelty - but that did not discuss such phenomenon in the context of service activities. After applying the stated selection criteria's, we were finally able to build a database containing 209 papers published on the theme "service innovation" between 1990 and 2014.

Having such articles selection, we have built a database containing the following information about each article: directory of origin, periodical who published it, year of publication, title, authors, countries of origin for each author, original keywords and number of citations. This last item was added after obtaining each papers number of citations in Google Scholar. There have been some rare cases with no keywords originally assigned. In such circumstances, key words were attributed to those papers considering its title, content and methods.

To perform the proposed analyzes, this paper is structured as follows. First, we present a brief overview of the theoretical development for the service innovation theme. The methods description follows this section. Coding procedures are presented in details, showing our path to constitute ten explicative categories for the most frequent themes researched on service innovation. The paper then presents its analyses showing articles distribution on categories. Years of publication, top publishing journals and thematic proximity between themes are explored throughout several analyses. Top publishing countries, authors and top cited papers are also highlighted. In its very last session, we present a research agenda from thematic combination gaps.

1 Service Innovation: what do we know about the research field so far?

The task of mapping the studies on service innovation may consider this research topic within a broader context that encompasses innovation studies themselves. Since the initial studies of Schumpeter in 1912 (1934; 2013), a wide range of works have been published within a commonly called neo-Schumpeterian theoretical line, which gained notoriety from the 1950s.

This timeframe culminates on a paradigm shift in the economics studies. The industrial sector maintained its majority position in the composition of major world economies GDP during the first five decades of the last century (1900-1950). Therefore, the industrial sector became the focus of analysis for economic performance studies. In a parallel process, the service sector had been gaining notoriety in post-Fordist period (after 1940) which culminated with the decline of industrial activities.

Once industry was losing strength, the service sector drew a growing trend in terms of importance. This trajectory attracted attention of studies on economic performance, including studies on innovation topics, which have begun to recognize the urgency to apply sectorial perspective to their analysis (Pavitt, 1984). Thus arose the first studies on innovation in the service sector.

The works of Barras (1986; 1990) are commonly taken as the first to study innovation in services. In presenting its reverse product cycle, Barras (1986) infers that the innovation in services would not be endogenous, but result from the absorption of innovations originally generated in industry. By that point, the study of service innovation was restricted mainly to the analysis of technological innovations originating from manufacturing activities (Gallouj & Weinstein, 1997). This approach is commonly referred to as the technologist or assimilative one (Gallouj & Djellal, 2010).

In the decades of 1990 and 2000, many studies were published in order to advance this initial perspective. The debate on the services ability to generate genuine innovations became then a settled point and new debates emerged.

How do innovations happen in services and what are its characteristics were some of the notorious questions. A new wave of studies emerged with the purpose of understanding the specificities and peculiarities of innovation in services. Gallouj (2002) points that these studies share a common approach by carrying its analysis on peculiarities of services activities, what the author had previously names as the “service-oriented approach” (Gallouj & Weinstein, 1997) or the differentiation one (Gallouj & Djellal, 2010).

As the distinctions between services and manufacturing sector and activities become blurred (Coombs & Miles, 2000; Miles, 2000), one theoretical gap becomes clear: how could we understand innovation in a cross-sectoral perspective? Many relevant works (Sundbo, 1997; Sundbo & Gallouj, 2000) led to the construction of an approach to integrate services and goods into a single theoretical approach for the study of innovation. It is the integrative approach (Gallouj & Djellal, 2010).

In a recent state of the art traced by Gallouj and Savona (2009; 2010), some characteristics for the production on service innovation became clear. The authors report such production as “more fragmented and less empirically grounded than the literature on innovation in the manufacturing sector” (Gallouj & Savona, 2010, p. 27) and trace four axes along which the literature on the service innovation field could be analysed: assimilation vs demarcation; theoretical vs empirical; typological vs analytical; and demanded vs supply-oriented. The first axis contains works consistent with the technicist approach (assimilation) or the service-oriented (demarcation) one. The second one would split works into conceptual or empirical-based; as the third (typological vs analytical) will differentiate works that adopt a typology to systematize innovation in services of those who “aim to disassemble the evidence into components” (Gallouj & Savona, 2010, p. 29) for analytical purposes. The last axis divides works between those who focus on the role of demand and those who focus on the supply side on the innovation process.

The axes of analysis presented by Gallouj and Savona (2010) represent an effort to highlight - and possibly systematize - theoretical, methodological and approach choices adopted by late works. It is noteworthy, however, that their contribution differs from the purpose adopted in this particular work. The mentioned authors seek transversal axes for the analysis and they admit intersections between the axes themselves. Thus, one particular work could be analysed in the light of the four axes. We could analyse its assimilation or demarcation positioning; its theoretical or empirical options; its theological or analytical nature; and its placement by demand or supply oriented. The present paper, however, has its construction aimed at identifying recurring research themes in the 30 last year’s production on service innovation and we have as main goal to ensure that the issues outlined are mutually excluding each other. Thus, one research theme identified on the existing literature as “Performance”, for example, could not overlap other topics. Therefore, this work consists of an attempt to map the themes already mobilized in previous researches instead of constructing an analytic framework for the literature, as done by Gallouj & Savona (2010).

2 Method

Having the main purpose of this article - to map the evolution of the service innovation field of study over the last 30 years - as a target, the first step was to assemble the database formed by 209 articles analysed as early described in this paper's introduction section. The next step consisted on doing a content analysis on all selected articles. This analysis aimed to map the main themes and research options adopted by each of the papers in order to generate descriptive statistics able to show the more or less frequent options in the field of study. The construction of these statistics helped tracing the evolution of the main topics studied over the 30 years comprised in this research. This will elucidate the paths that researchers, editors and journals have chosen.

We extracted the following information from each of the selected articles: journal of origin, year of publication, title, authors, authors origin countries, original keywords and number of received citations. Statistical analyses were carried out on these data in order to achieve the desired outputs for this work. Thus, ten main outputs will be presented in the following sections: keywords after coding, top publishing journals, number of articles published by year from 1986-2014, number of published papers per keyword per year, Multiple Correspondence Analysis considering the whole production, Multiple Correspondence Analysis considering temporal cut-outs for comparison, top publishing countries, top publishing authors, top cited authors and works and the most influential papers positioned on our MCA analyses.

2.1 Coding

The coding performed in this study aimed to construct explanatory categories representing the main themes discussed in the analysed articles. The coding procedures considered the number of original keywords assigned by authors in their papers. This set of keywords was converted into one major list in order to identify the most frequent keywords used on service innovation. The total number of keywords obtained was 866. It is a high number and we believe it reflects the great variety of topics and low unification of keywords. The list made it clear that many keywords had absolute correspondence among themselves – such as “service science” and “service sciences” or “service” and “services” – and although initially different, they were manually merged. We came up with a list of 488 different unique keywords.

Most of the remaining keywords (372 of 488, 42.9%) had only one appearance on the list. These keywords were unhelpful for categorization, so they were discarded. 113 different keywords remained having at least two appearances in the database. These 113 keywords represented the starting point for coding. In the next step we eliminated terms representing pleonasms on the research topic itself, such as “services”, which appeared 28 times, or “innovation”, the

keyword with the highest incidence (77 appearances). Additional terms were also eliminated for the same reason, such as "service innovation" and "service industries".

Two extra discard procedures were carried out on terms representing countries of origin or research methods. Since our purpose was not to identify methodological approaches, but major themes worked in service innovation, we have excluded every keyword referred to as "methods", such as "content analysis" and "survey". After all discharges, the final items on the list dropped to 95, having 283 total appearances.

The 95 unique keywords suffered a content analysis and coding following the procedures presented by Bardin (1977), Bauer & Gaskell (2000) and Flick (2008a; 2008b). They generated nine thematic categories useful to explain the recurring themes in studies on service innovation. Only 20 out of 95 keywords did not match the nine categories. Considering the original amount of 283 appearances for the 95 keywords, 75 unique keywords covered 228 appearances, representing 80.5% of total appearances, a good balance. Such options allowed us to compose nine thematic categories with statistical power and meaningful representation in terms of their content. Table 1 shows every original keyword placed in the nine created categories.

Table 1. Original keywords and its placement into categories.

Categories	Original keywords
Customers	Customer service management; Customer involvement, Customer satisfaction, Co-creation, Consumer behavior, Customer co-creation, Customer orientation, Customer service, Customer interaction, Customer relations, Customers, Lead users, Service-Dominant Logic (SDL), Customization, Market orientation, Service encounters, Servitization.
ICT	ICT-based encounters, Communication Technologies, Information and Communications Technology (ICT), Information networks, Information Technology, Innovation network.
Innovation efforts	Strategy, Innovation orientation, Attitude, Innovativeness.
Knowledge	Knowledge-intensive business services (KIBS), Knowledge Sharing (KS), Knowledge, Knowledge management, Collaboration, Knowledge diffusion, Learning, Partner match.
NSD	New Service Development, Service development, Service design, New products.
Performance	Organizational performance, Service Innovation Performance (SIP), CIS, Critical success factors, Innovation Performance Indicator, New service performance, Organizational innovation, Service delivery, Service quality, Value creation.
Public sector	Innovation policy, Public sector, Public Service Innovation, Public services.
R&D	Open innovation, R&D services.
Sectorial analyses	Financial services, Service sectors, Manufacturing, Small firms, Emerging markets, Industrial services, Professional services, Telecommunications, Automotive industry, Banking services, Business-to-business services, Construction industry, Electronic commerce, Electronics industry, Gas industry, Health care, Health services, Hotel Industry, Oil industry, Small to medium-sized enterprises.

Once the categories were created, each paper was classified in order to fit into one or more categories. No limits were set about the number of categories per article, leading to articles that fit into one unique category, while others fit in two, three or even more. This fact explains why the total percent in Table 2 is not equal to 100%. In average numbers, each article fits into two categories, considering that we made 399 category placements for 209 articles. To set an article for a particular category, we have considered every one of the following: original keywords, title, abstract and performed research. Such procedure showed us the urgency to create an additional category to comprise articles who show theoretical advance for the field such as modelling or typologies propositions for service innovation. Since those articles usually had a broad approach focusing on theoretical contributions to the field itself – such as Gallouj & Weinstein (1997), who present a typology for service innovation –, they did not fit any minor theme in the field. Those papers have been placed in a new category created to encompass such items. The tenth category was named Theoretical advances and modeling. Table 2 shows the number of papers in each of the ten categories.

Table 2. Number of articles by category.

Categories	Number of articles	Valid Percent
Performance	68	32.54
Sectorial analyses	64	30.62
Innovation efforts	62	29.67
Customers	52	24.88
NSD	40	19.14
Knowledge	35	16.75

Categories	Number of articles	Valid Percent
ICT	28	13.40
Theoretical advances and modeling	20	9.57
Public sector	17	8.13
R&D	13	6.22
Total	399	190.91

3 Analysis

The 209 selected articles have been published from 1986 to 2014. Although the search for articles has considered 1984 as initial date, the first article actually selected was published in 1986. Table 3 shows the number of selected articles published per year. An interesting phenomenon may be observed about the year of publication. Although this research has considered 30 years in its pursuits and has obtained, effectively, a publication interval of 28 years (1986-2014 inclusive), the early years of this interval record very low incidence of articles published on the topic of service innovation. Until 2001, only 9.6% of selected articles had been published and only 20.6% until 2006. It means that 25.8% of the articles have been published along the first 21 years. The remaining 74.2% were published in the last seven years. These data underscore how recent the field of study is, achieving its publication peak only on the last decade. Although recent, the field's production has been stable, considering that the average number of publications in the years 2007-2010 remained constant, at around 14 per year. Between 2010 and 2011, there was a leap in annual publication numbers, which have increased from 16 to 28. This new level has showed itself to be stable from 2011 to 2013, with an average of 31 publications per year.

Table 3. Year of publication for selected articles.

	Frequency	Valid Percent	Cumulative Percent
1986	1	.5	.5
1988	1	.5	1.0
1989	3	1.4	2.4
1990	1	.5	2.9
1997	4	1.9	4.8
1998	3	1.4	6.2
1999	4	1.9	8.1
2000	2	1.0	9.1
2001	1	.5	9.6
2002	6	2.9	12.4
2003	5	2.4	14.8
2004	3	1.4	16.3
2005	3	1.4	17.7
2006	6	2.9	20.6
2007	11	5.3	25.8
2008	12	5.7	31.6
2009	16	7.7	39.2
2010	16	7.7	46.9
2011	28	13.4	60.3
2012	33	15.8	76.1
2013	33	15.8	91.9
2014	17	8.1	100.0
Total	209	100.0	

Another interesting analysis arose when considering the top publishing journals on the selected databases. 112 different journals appear in the list and 37.8% of the articles were published in journals who had one unique appearance on our

database. 50.2% of journals appear only once or twice in the database. Only 19 journals have achieved more than three papers published. Table 4 shows the 19 top journals.

Table 4. Top journals publishing selected articles.

Journals	Frequency	Percent	Cumulative Percent
Research Policy	16	7.7	7.7
Journal of Business & Industrial Marketing	11	5.3	12.9
Journal of Service Research	10	4.8	17.7
Journal of Services Marketing	10	4.8	22.5
Journal of Service Management	9	4.3	26.8
European Journal of Innovation Management	4	1.9	28.7
Industrial Management & Data Systems	4	1.9	30.6
International Journal of Operations & Production Management	4	1.9	32.5
Management Decision	4	1.9	34.4
Structural Change and Economic Dynamics	4	1.9	36.4
Innovation: management, policy & practice	3	1.4	37.8
Innovation: Management, policy & practice	3	1.4	39.2
International Business Research	3	1.4	40.7
International Journal of Academic Research in Business and S. Sciences	3	1.4	42.1
International Journal of Business and Social Science	3	1.4	43.5
International Journal of Production Economics	3	1.4	45.0
Journal of Evolutionary Economics	3	1.4	46.4
Managing Service Quality	3	1.4	47.8
The International Journal of Organizational Innovation	3	1.4	49.3

The construction of the ten categories reported in the previous section allowed us to evaluate the incidence of the main discussed themes (represented by our ten categories). Table 5 shows how many times a category has been mobilized considering 5 time cut-outs. We should remind our reader that such table does not express our number of articles, but the amount of existing categories mobilized on articles from our database. Data analysis for Table 5 shows increasing uses of categories over time. It is certainly coincident with the observed increase on the number of published papers along the years. On five temporal cutouts, the incidence of mobilized categories started on 10 and gradually raised to 25, 28, 121 and 215.

Table 5. Papers in categories over time.

Categories	1986-1990		1996-2000		2001-2005		2006-2010		2011-2014	
	Count	% for 1986-1990	Count	% for 1996-2000	Count	% for 2001-2005	Count	% for 2006-2010	Count	% for 2011-2014
Customers	2	20.0%	1	4.0%	4	14.3%	13	10.7%	32	14.9%
ICT	1	10.0%	2	8.0%	3	10.7%	11	9.1%	11	5.1%
Innovation Efforts	2	20.0%	3	12.0%	2	7.1%	22	18.2%	33	15.3%
Knowledge	0	0.0%	3	12.0%	6	21.4%	12	9.9%	14	6.5%
NSD	2	20.0%	0	0.0%	3	10.7%	13	10.7%	22	10.2%
Performance	3	30.0%	6	24.0%	6	21.4%	14	11.6%	39	18.1%
Public Sector	0	0.0%	0	0.0%	0	0.0%	7	5.8%	10	4.7%
R&D	0	0.0%	1	4.0%	0	0.0%	4	3.3%	8	3.7%
Sectorial Analyses	0	0.0%	7	28.0%	2	7.1%	18	14.9%	37	17.2%
Theoretical Adv.	0	0.0%	2	8.0%	2	7.1%	7	5.8%	9	4.2%
Totals	10	-	25	-	28	-	121	-	215	-
% considering 399	10	3%	25	6%	28	7%	121	30%	215	54%

* There are no research records for 1991–1995.

We have calculated the proportional increase on the incidence of mobilized categories considering the total amount (399) as well as the individual amounts for each category. We adopted $PI_n = \frac{Count_n - Count_{n-1}}{Count_{n-1}}$, in which PI_n stands for Proportional Increase and $Count_n$ stands for the number of appearances for each category in a specific cut-out. The first column on Table 6 (PI_0) does not have established values, since we assumed the previous incidence was null. That logic also explains why we have set null value to the "Knowledge" category for 1996-2000 and 1986-1990, considering there were no previous non-null incidences. Thus, we calculate each of the proportional increases shown in Table 6 considering the second non-null incidence. Such proportional increase always accounts for the last non-null evidence on its previous time cutout. If a negative sign appears, it means its variation relative to previous time cutouts has actually decreased. In the absence of such signal, it has increased. Column OI on Table 6 stands for "Overall Increase". It summarizes the overall trajectory of increases in PI for each category considering the range between the maximum and minimum values of Counts for each category. At this point, we keep our option to consider only non-null PI and we apply $OI = \frac{Count_{max} - Count_{min}}{Count_{min}}$. This is why we forced our calculus for the minimum score on $Count_n$ instead of using $Count_0$. Therefore, OI shows how many times Counts have increased or decreased considering its maximum and minimum values from 1986-1990 until 2011-2014.

Table 6. Evolution of categories incidence over time.

Categories	1986-1990		1996-2000		2001-2005		2006-2010		2011-2014		OI
	Count ₀	PI ₀	Count ₁	PI ₁	Count ₂	PI ₂	Count ₃	PI ₃	Count ₄	PI ₄	
Customers	2	-	1	-0.5	4	3.00	13	2.25	32	1.46	31
ICT	1	-	2	1.00	3	0.50	11	2.67	11	0.00	10
Innovation Efforts	2	-	3	0.50	2	-0.33	22	10.00	33	0.50	16
Knowledge	0	-	3	-	6	1.00	12	1.00	14	0.17	4
NSD	2	-	0	-1.00	3	0.50	13	3.33	22	0.69	10
Performance	3	-	6	1.00	6	0.00	14	1.33	39	1.79	12
Public Sector	0	-	0	-	0	-	7	-	10	0.43	0.5
R&D	0	-	1	-	0	-1.00	4	-	8	1.00	7
Sectorial Analyses	0	-	7	-	2	-0.71	18	8.00	37	1.06	4
Theoretical Adv.	0	-	2	-	2	0.00	7	2.50	9	0.29	4
Values over 399	10	-	25	1.50	28	0.12	121	3.32	215	0.78	97

The results show us how every category evolved over time. While some subjects had a delayed appearance, such as Public Sector and R&D, other themes have had a more stable growth path from the very beginning, such as Customers, Innovation Efforts and Performance. The most often worked theme over the years is Performance, that scores for 17% of all Counts (considering the number of 399). Performance also reached 12 on its OI, experiencing a significant growth over time. Secondly in terms of appearance are the categories Sectorial Analyses and Innovation Efforts, both with 16% of appearance rate. Although they share the same appearance, their OI value is quite different. Sectorial Analyses OI is only four, showing the progressive growth has not been higher since the category has started later with a large number of works (7 in total) in the period 1996-2000. It happens to be a category that emerged in the second cut-out with plenty of frequency and that has succeeded to keep its force.

The Innovation Efforts category, on the other hand, reaches an elevated OI of 16, having begun with few appearances on the base and so remained for the first three cutouts. However, from fourth cut-out (2006–2010), it has suffered a very quick burst on its number of appearances, going from the previous average of 2 or 3 to 22 and, then, to 33.

By crossing OI, Counts and PI, we have mapped four similar trajectories performed by each of our 10 categories considering their OI and PI. We have therefore established four groups:

- Customers, Innovation Efforts and Performance issues are **Founders with high growth**, having received research attention since the emergence of the service innovation studies. They have grown in significant pace and became the most traditional themes within the studies on service innovation.
- ICT, NSD and Sectorial Analyses are **Non-founders with moderate growth**. Attention has been given to them from the beginning, but they have achieved small initial numbers. They represent an important share of all studies, with 7%, 10% and 16% of total appearances. They have intermediate Counts.
- R&D, Knowledge Modelling and Theoretical Advances are considered **Late appearance with moderate growth**. Those themes have not been explored from the beginning and have low Counts. They account for 3%, 9% and 5% of total appearances.
- Public Sector is considered **Late appearance and poor growth**, being a research theme with late adoption, having no appearance up to the third cut-out. It acquired some expression in the last two cutouts, assuming 4% of total appearances. However, it has the lowest Count of all: 0.5, showing weak growth.

Such groups appear in Figure 1 positioned in a double axis structure showing two dimensions: Adoption (with the initial adoption / Late adoption extremes) and Growth (with the Low growth / High growth extremes). The four groups and their positions are:

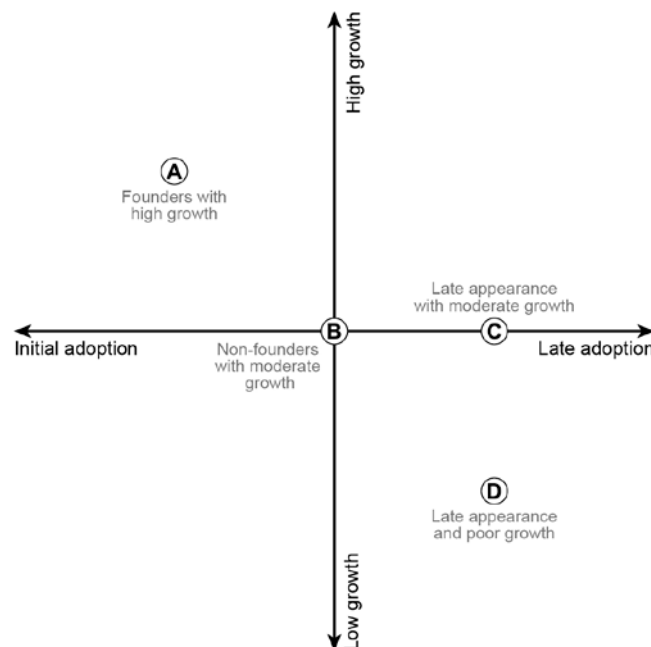


Figure 1. Groups position on Adoption X Dimension axis.

Having the thematic structure for the service innovation field in mind, some later questions have emerged. How do the ten categories relate to each other? Could we identify topics commonly seen together on service innovation studies? Could our data reveal gaps for thematic combinations rarely or never worked? The answers to those questions emerge from two Multiple Correspondence Analyses (MCA) we have performed.

MCA is a correspondence analysis that allows graphic display for multiple categorical variables. Therefore, it is a multivariate data analysis. In terms, it is similar to principal correspondence analysis, but it fits categorical data, such as

our 10 variables. Correspondence analyses use binary ratings "yes" and "no" to express the presence or the absence of an attribute. In our study, such ratings are set for each of our 209 papers considering if each one of them fits into a category or not (1 for "yes", 0 for "no"). In such technique, the chi-square value is transformed into an arithmetic measure of distance from a central point that represents the overall mean for the distribution (Hair, Black, Babin, Anderson & Tatham, 2006). An MCA is based on multi-way tables that show relationships between nominal variables (Furrer et al., 2008).

As well as multidimensional scalings, a MCA shows a graphic positioning for each variable based on its multiple correlations. This feature is especially useful for our analysis, which considers 10 categories, now assumed as variables. They all happen to have negatively skewed distribution. It means that they have non-normal distributions highly right concentrated (Field, 2009), since 84% of our fitting into a category frequencies focus on cut-outs posterior to 2006. As a MCA is not particularly affected by non-normality of data, we have chosen it to represent connections among our categories.

Interpreting the results of an MCA is relatively simple. If two variables have similar Count patterns, they will appear next to each other in the MCA. The further away two variables happen to appear in the MCA output, the lower the correlation between them in the data sample (Bendixen, 1995). Figure 2 shows our general MCA for every data on our sample. In such MCA, our categories appear as circles. The size of a circle is proportional to its number of appearances (frequency) on our database.

One prior procedure for the MCA consists on calculating the Eigenvalues curve. The eigenvalues scores show the percentage of explained variance, stating the number of dimensions that would better fit the data. Therefore, eigenvalues are a criterion to define how many explanatory dimensions could be stated prior to a MCA, as is usually done on factorial analyses. The values of the eigenvalues calculated for our distribution are 1.51, 1.39, 1.24, 1.13, 1.05, 0.9 and 0.84. Since there is no evident break on these values, we therefore chose to perform an MCA with two explanatory dimensions for graphical data representation.

One way to interpret the data in a MCA requires us to identify dimensions considering themes distribution. The next step would be to describe such dimensions in theoretical terms. Furrer et al. (2008) present an excellent use of this technique by describing two dimensions. In our case, however, we have 50% less variables than those authors. Therefore, we have based our analysis on two criteria: distance between points and distance from each point to the overall average point (0,0).

In our MCA, we see highly related themes, such as NSD and Customers or Knowledge and R&D. Those connections are expected considering the nature of such themes. The same may be stated for Innovation Efforts and Performance – two themes usually seen together in comparative studies. However, what could we learn from themes that appear far apart on the MCA?

Two issues call for our attention on the MCA. First, such analysis shows isolated themes, i.e., subjects that are not frequently researched together. Public Sector and ICT are the best examples. Secondly, the MCA shows non-isolated but unfrequently combined themes. Such themes show low variability in its combination to different topics. Knowledge, for example, appears far from the themes Customers, NSD, Innovation Efforts and Theoretical Advances and Modelling. From that perspective, we may infer the existence of gaps to be filled by studies that investigate, among others: the role of knowledge in New Service Development; forms of appropriation of knowledge from consumers or for consumers; or even knowledge as input for innovation. It also shows a possible gap for researches accounting for theoretical development involving knowledge.

Although inferences about gaps for future studies are relatively easy to state from a MCA output, caution is highly recommended. Although the MCA outputs allow us to map theme intersections and to see many possible gaps appear, not all gaps have theoretical relevance or even technical feasibility. R&D and ICT, for example, have low correlation. It means they have been poorly combined as themes on previous researches. But does it really point to a research gap? This is an answer to be given by researchers, since statistics only provide circumstantial evidence. As well as R&D and ICT, some extra unusual combinations on low-correlated themes may point technically coherent gaps, but not necessarily theoretical relevant gaps.

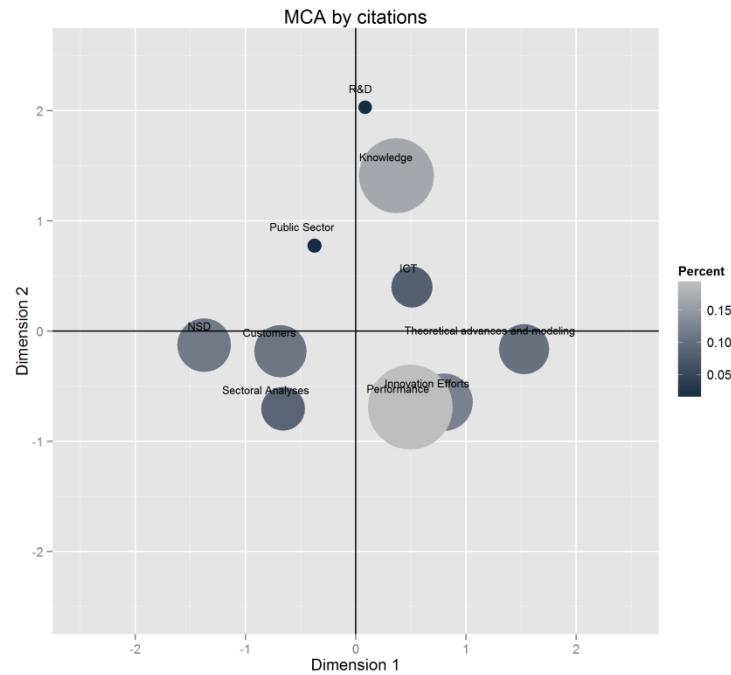


Figure 2. Multiple Correspondence Analysis for 209 papers on 28 years.

What if temporal perspective is applied to a MCA? Such technique pointed out positioning changes performed by each category throughout cutouts. Figure 3 shows the precise trajectory carried out by each single category. The small dot at the beginning of each arrow shows each category starting position in its first appearance on previously set cut-outs, since not all categories present themselves in every cut-out. The arrowhead stands for each category's last position. Figure 3 is far from revealing uniform trajectories. While some themes approach to each other or go into the same direction, others strongly repel. The common characteristics for our themes seems to be their positioning impermanence and their lack of trajectory uniformity.

Figure 3. Themes trajectories on MCA over 28 years.

Having the MCA results finally presented, we believe the data may reveal two more aspects concerning the service innovation research field. First, we may consider the number of publications produced by each of the countries appearing in our database. Those countries do not represent our authors' places of birth, but the countries where their research institutions currently operate. For multiple author's papers, research institutions for each author were taken into account. No distinction has been made concerning first, second or last authors. That way, one work is frequently representative of more than one country. From author's countries data, we have built a single list for which we calculated the top publishing countries. Our 209 papers have been assigned to 486 instances of countries. Figure 4 shows papers published by country. USA, UK and Taiwan are the top countries and have published respectively 16%,

14% and 8% of all papers. 38% of total world production on service innovation involves those three countries. 75% of our global production involves at least one of the top 10 countries. In total, 33 countries appear in our database having at least one assigned work.

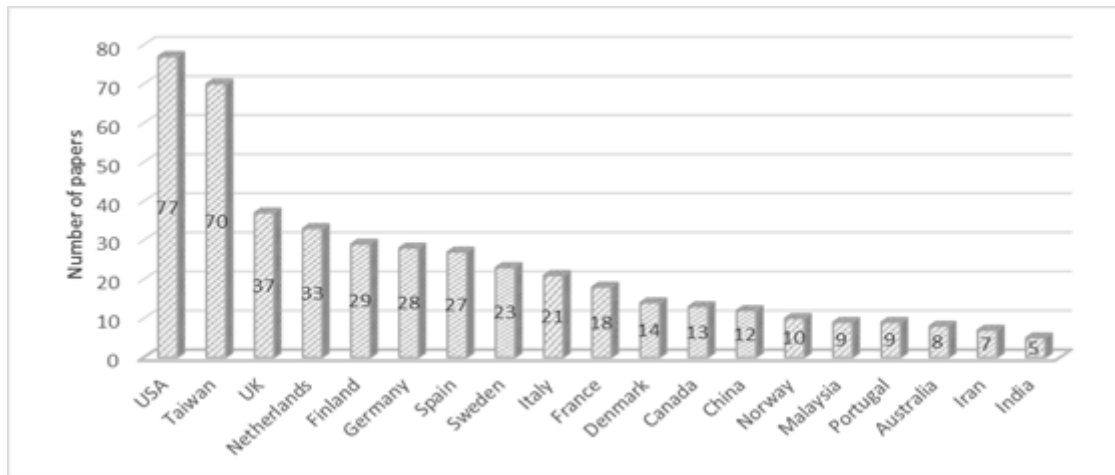


Figure 4. Top publishing countries.

A little more about the service innovation production becomes evident by mapping top publishing authors in the field. We considered every appearance of an author in our database regardless of authoring position in a particular work. Therefore, the first author on a paper has been given as much value as its last. Therefore we generated a single list with total publications by author. Top publishing authors on service innovation are Alam, I., who has seven published works, Tsou, HT with 6, Chen, JS and Gallouj, F., with 5 each, Gottfridsson, P. and Rubalcaba, L., both with 4 and Hipp, C., Meigounpoory, M. and Scupola, A., with 3. We have also cared to point out the most widespread papers on service innovation. We have considered the number of received citations by each of the 209 papers in our database and formed a ranking. Such procedure showed the ten most cited papers in our field over the 28 years. Top cited works are shown in Figure 5: Gallouj & Weinstein (1997) has 1201 citations, Barras (1986) has 967, Muller & Zenker (2001) have 685, Barras (1990) has 505, Drejer (2004) has 495, Hipp & Grupp (2005) have 483, De Brentani (1989) have 444, Alam & Perry (2002) have 418, Scheuing & Johnson (1989) have 390 and Goes & Park have (1997) 365.

Since we have identified top cited papers on service innovation, as a last effort, we have highlighted them on our MCA analysis. Each paper position considers its assigned categories. Interestingly, the high concentration of papers in the first and second quadrants shows the thematic proximity between them resulting in higher correlation between these works when compared to papers appearing on third or fourth quadrants. The font size of each paper is proportional to its citations number. Colors are a resource for easy viewing and have no statistical meaning.

By investigating the main categories assigned by these 10 papers, we have identified the most frequent themes among them. Customers, ICT, Innovation Efforts and Performance are the most frequent categories. Interestingly, none of these 10 works mobilizes NSD category and only two of them mobilize Theoretical Advances and Modelling. It shows us that top cited papers are not necessarily those with proposals for theoretical development.

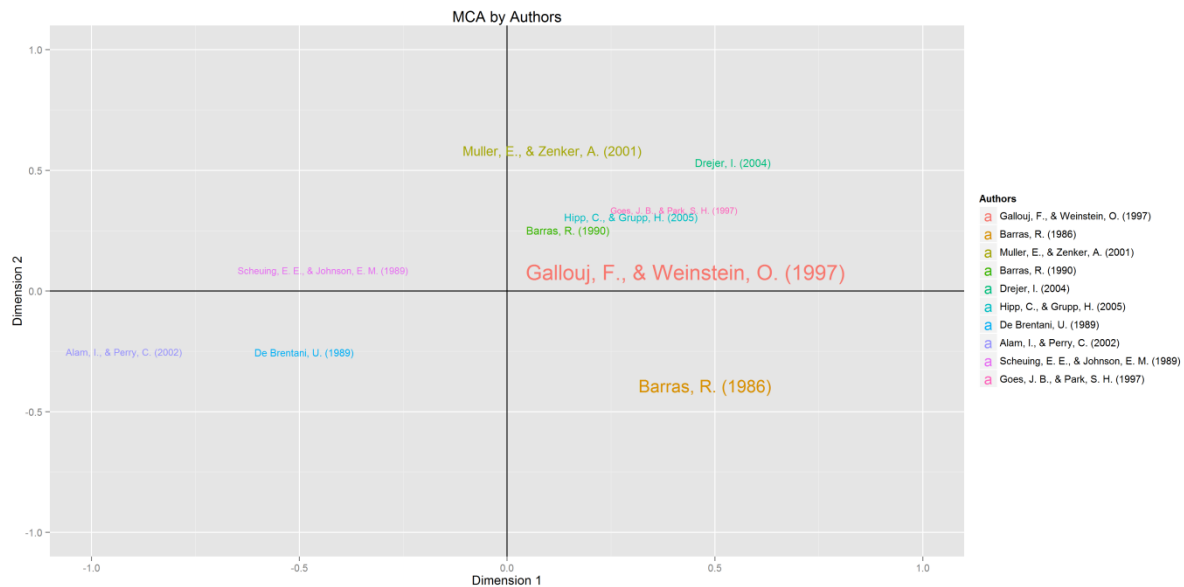


Figure 5. Top cited papers in MCA.

4 Conclusions

This work presents the effort to map the evolution of the service innovation theme of study over the last 30 years (1984–2014). A large effort has been conducted to identify, select and analyze papers published in open databases and directories. 209 papers have been selected and their data constitute the whole database used for all analyses described in the present work. Two main inquiries have been stated. First: what are the majors research themes explored in service innovation and how do they relate to each other? Second: which authors and journals publish more and which particular works have achieved higher degree of diffusion in the service innovation theme along the last 30 years?

As we moved forward on the analyses carried out on this paper, we have answered the first inquiry by showing 10 categories that correspond to the main themes explored by published papers on service innovation. Performance, Sectorial analyses and Innovation efforts represent the most popular themes on our field. Those themes appear respectively on 68%, 64% and 62% of all published papers over time (nonexclusive). The least representative themes happen to be R&D (13%), Public Sector (17%) and Theoretical advances and modeling (20%). These categories behaviors and peculiarities have been tested in several analyses.

Although studies in the field have been started in the 1980s, the occurrence of publications is highly concentrated after 2010 (60% of the papers fit here). As increasing in the amount of published papers over the last 30 years was not gradual, two indicators were built to help us understand this trajectory. Proportional Increase (PI) showed the number of appearances for each category in a specific cutout and Increase Overall (OI) summarized the overall trajectory of increases in PI for each category considering the range between its maximum and minimum values of Counts. Results showed us that while some themes began to appear late (such as Public Sector and R&D), other have experienced more stable growth from the beginning (such as Customers, Innovation Efforts and Performance).

By crossing OI, Counts and PI, we have established four groups in which categories were placed: **Founders with high growth, Non-founders with moderate growth, Late appearance with moderate growth** and **Late appearance and poor growth**. In order to identify how the ten categories relate to each other, we have performed a couple of Multiple Correspondence Analyses that showed interesting peculiarities of our field of study. There are isolated themes, such as Public Sector and ICT, that are rarely researched in addition to other themes. Otherwise, some themes are often combined to the same themes on researches, such as Innovation efforts and Performance. Such analyses allowed us to trace possible gaps to be explored by future studies. Thus, we may present a general research agenda composed by the following theme combinations, corresponding to actual gaps: R&D and NSD; R&D and Customers; Theoretical advances and modelling concerning R&D in services; Knowledge and NSD; Knowledge and Customers; Knowledge and Performance; Knowledge and Innovation efforts, etc. Readers may infer many more combinations by analyzing Figure 2.

The existence of so evident research gaps reinforces our impression of the service innovation study field as having its research lines still emerging or in consolidation phase. The analysis of positioning changes performed by each category throughout cutouts on a MCA (Figure 3) revealed mostly non-uniform trajectories, having themes approaching each other or going into the same direction, while others are strongly repelled from the others. Such fact led us to the conclude that the general characteristics for our ten themes seems to be their constant change of combination with each other and their lack of trajectory uniformity. The most visible feature is the apparent consolidation of themes that, little by little, may be recognized as the more traditional on studies of service innovation: Performance, Sectorial analyses, Innovation efforts, Customers, NSD and Knowledge.

The second minor inquiry on this paper has been answered by showing the top publishing journals - Research Policy, Journal of Business & Industrial Marketing, Journal of Service Research, Journal of Services Marketing and Journal of Service Management -, countries - USA, UK and Taiwan -, authors - Alam, I., Tsou, HT., Chen, JS., Gallouj, F., Gottfridsson, P. and Rubalcaba, L. - and cited papers - Gallouj & Weinstein (1997), Barras (1986), Muller & Zenker (2001), Barras (1990) and Drejer (2004).

In summary, what do we see as future challenges after 30 years of research on service innovation? Which research questions emerge from our research? First, one should keep in mind that service innovation is a young field of study, having most of its works published only from 2010 on. The biggest part of the field history is currently being written in the present decade. Service innovation, as a field of study, is so recent that it would be premature to draw absolute explanatory dimensions to represent it. What we can point out, so far, is the existence of issues of greatest expression in the field – Performance, Sectorial analyses and Innovation efforts - and lower expression – R&D, Public sector and Theoretical advances and modeling. Likewise, we may account for some topics that happen to be traditionally studied together in order to present a research agenda based on the combination of themes that appear isolated on our analyses, having experienced few combination with each other. Having that well settled, we would point out the following three aspects as components of a research agenda for the study field:

- Studies concerning Public Sector are the latest trend in the field, having appeared only in the last two cutouts (post 2010). Thus, future research will find on this subject a subfield to be explored along with other themes. A priority question emerges: how does service innovation perform in the public sector?
- R&D is still an emerging theme for service innovation, having low incidence on published papers so far. It has also been poorly combined with other themes. It draws a second research question: how can we interpret, measure and compare R&D role on service innovation?
- Although customer roles on service innovation have received significant attention from previous studies, little or nothing at all has been researched about the role of these actors in generating and disseminating knowledge on service innovation process. In addition, little has been explored about their role in innovations generated in public service. A couple questions emerge: which new roles will customers play in highly knowledge dependent service innovations? And what role will citizens have, as customers, on innovations generated in public services?

Certainly, these three gaps do not address to every research gaps on the service innovation field, but we believe they may be useful for future discussions concerning the research directions for decades to come. For now, we choose to emphasize our main limitation on this study, which refers to the fact that papers published in not open journals could not be included. Such limitation shows us a future challenge: how will we ensure that the service innovation research production may be widely spread in the future? We would like to launch that question for the future discussions to be carried by researchers in our field.

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Career Choice Factors and Job Satisfaction for Young Doctors in Romania

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Among the core competencies of the SHRM (Strategic Human Resource Management) we should take into consideration the ones regarding finding, keeping and managing special skills, the impact and necessity of innovation, and also providing outstanding service within the Romanian medical system. Those elements may represent the main characteristics in order to provide and adopt good strategic policies within the healthcare system. Furthermore, given those aspects, young doctors in Romania may find the medical career appealing and developing new competencies and job satisfaction within the public and private hospitals in Romania.

Motivation of the medical staff is a poorly appreciated issue, nationally speaking, although the development of some motivation strategies will potentially lead to an increase in employee retention.

1 Current Human Resources Policy in The Healthcare System in Romania

"According to the Report of the Presidential Commission for review and development of public health policy in Romania (2008, p. 57) the following recommendations about the direction the human resources policy in healthcare should follow were made:

- Developing a coherent training policy,
- Development and allocation of human resources in health,
- Increasing the number of medical staff,
- Career development in the medical field.

Human resource planning should be a priority in terms of health sector policies. The need for human resource planning is vital because a health system which does not provide any analysis on the existing number of doctors, the needed number of physicians and specialist doctors in a particular area based on population health, the orientation of doctors towards specializations to meet the needs of citizens, is a healthcare system with no future" (Pupăză; Amalia, 2009).

As for directing doctors to rural areas, Galan proposed in 2009 (Galan; A. – 2009):

- Designing and implementing a control mechanism of the phenomenon of migration (internal / external)
- Involvement of local communities in attracting and retaining medical staff (especially GPs) in rural areas;
- Design a plan identifying training and career development opportunities in rural areas.

1.1 Medical Human Resources Development

The World Health Organization offers the following suggestions regarding strategic planning, training and medical staff development, both urban but mostly rural and / or in remote areas of Romania:

- Specific programs to support students from rural areas to enrol in school;
- Recruitment of staff from rural area and offering training programs;
- Early exposure to practical training in medical trials (possibly with the possibility of changing rural locations to achieve diversification);
- Introducing information educational programs;
- Involvement of rural communities in the recruitment and selection of students and future graduates;
- Providing mandatory benefits to applicants;
- Conditioning licensing and specializations on practicing medicine in rural areas for foreign doctors;
- Recognition of foreign awarded qualifications
- Supporting the development of initiatives for continuous training and career development;
- Opportunities for a flexible schedule for part-time jobs.

1.2 Remuneration of Doctors in Romania

The Ministry of Health, after talks with union representatives and medical professionals agreed since 2013 to implement a new way to pay staff according to the performances obtained. This decision, which was much needed for a long time, will be beneficial for motivation and will lead, in long-term, to better retention of doctors and other health care professionals working in hospitals in Romania stations: the salary will be computed as a fixed part and a variable part. The fixed part would be represented by the level established at a certain date, while the variable will be determined on the basis of four criteria: a) training; b) quality of work; c) the amount of work; d) retention/fidelization of staff. "

Another proposal made to Ministry of Health refers to the introduction of a private system of payment in public hospitals. This would cater to patients who are willing to pay for medical services to have access to consultations from doctors in the hospital, and those doctors would receive a certain percentage. This system, though successful in other countries, is a way of overcharging in favor of the public budget, according to the percentages shown (Money.ro – 2013).

Although we will not disclose actual figures in terms of remuneration of health professionals in their early career, we will discuss strategies that should be considered in terms of the remuneration of doctors with 3-5 years experience in field:

- Motivating salaries for practitioners in rural areas;
- Providing benefits, including support for relocation;
- Payment of salaries and motivating bonuses depending on performance;
- Diversified remuneration systems (including co-payment);
- Providing loans (for cars, houses);
- Providing scholarships for their family's education;
- Providing non-salary benefits.

2 Performance Management and Correlation of Career Choice Factors, Motivation and Employers Satisfaction

Using the theoretical support, we may illustrate that the young and un-experienced doctors have chosen their career due to their expectations regarding the personal development, access to technology, networking, job satisfaction when helping the sick people. As seen for all the domains of activity, there is always the tendency to make comparisons when referring to other on same professional levels or even on other fields.

The public medical system lacks the management pursuit for intrinsic and extrinsic factors (according to Herzberg theory), meaning developing optimum job relationships, work and efforts recognition, work security. One of the theories that most reflect the situation of the human resources within the medical system is the Equity theory (Adams theory). Having this theory as a major support, we developed the research study in order to show its applicability.

2.1 Methodology and Tools

Regarding the methodology, the research undertaken refers to the core subjects of medical career – the decision, satisfaction and performance. In order to obtain clear information, we divided the research in two different multiple-choice questionnaires, one about the influences of career choices, and the other showing the link between job satisfaction and performance (Lungu; Oana Maria, 2014).

The results have shown that the choice regarding a medical career is not related to the involvement of family or friends, but more on obtaining a certain reputation and acknowledgement from the peers. Also, the perspective of a well-paid working place is a more important element in medical career choice. The greatest concern for all the people attending the research was the finding of a good working place (hospital) that offers the possibility and the necessary factors to develop a successful career with promotion possibilities and life-long programs.

As for the conclusions reached after evaluating the answers concerning the job satisfaction and performance, we have faced both expected and unexpected results. A large number of respondents agreed that they are pleased with all their working conditions, with their tasks, having the certainty that their work provides development of their working department. The econometric studies on the interrelation among career choice, job satisfaction and performance have led to many interpretations as the doctors provided a variety of answers and the study sample had a slightly reduced dimension.

The study that we conducted is primarily based on researching and identifying the factors that are most important for developing a career plan for young doctors. Thus, in this quantitative study, satisfaction and career decision are independent variables, while the employee's performance would be the dependent variable.

According to European studies (Eurofound, 2007), it was concluded that the level of satisfaction at work decreases with increasing levels of performance, experience or training. In other words, the more training employees have, the more it is likely to be less satisfied in their chosen jobs. From that to a decrease in motivation there is a very small step.

To find the best coefficients and indicators, we used the research study method. This is used mainly as a research method for social sciences because it has a high credibility and acceptance in academia. The main purpose of research studies is to generalize for a larger population sample based on the research results of a smaller sample of the population - in our case a given number of health professionals.

The independent and dependent variables of this study are:

- independent variables are in addition to the decision regarding the choice of a career in the medical field, remuneration and career satisfaction obtained that influence performance obtained under certain conditions by the medical professional - doctor;
- the dependent variable is the performance at work.

The data and information necessary for the study were obtained from filled-in questionnaires that were distributed to employees of the healthcare system. Among these employees we mention:

- Young residents in their first year of residency in certain specialties;
- Early career specialists who have received a work assignment after their specialty examination;
- Doctors working both in the public system and in the private one.

The research study was conducted on a total of 109 physicians (300 questionnaires were initially distributed) with different medical specialties, both in the public and the private sector (mainly public). In handing the questionnaire, they were assured of the confidentiality of the data and that this information will only be used for this research study.

The information and responses were summarized using Google tools and the verification of statistical connections was done using Eviews software.

To obtain the necessary data, we introduced the following tables with responses from the questionnaire on career satisfaction:

4. I am paid in accordance with the position (function) that I have.

Yes - 1

No - 2

I do not know - 3

5. I am is satisfied with the benefits received.

Yes - 0

No - 1

15. On a scale from 1 to 5, 1 being very poor, 5 being very strong, how would you assess your competitiveness on the labor market?

1 - very poor

5 - very strong.

2.2 Results and Analysis

First, referring to the financial benefits, the respondents answered in equal proportions that they are both satisfied and dissatisfied, dissatisfied of the proportionality of the salary to the position occupied, but also of the other benefits received.

The vast majority of respondents (94%) are aware of their respective job duties and of the expectations others have in respect of the work.

About the conditions in the workplace respondents answered in a high percentage (74%) that they have a reasonable workload and the working conditions offer them a certain degree of comfort. As noted above, one of the motivational factors that lead to increased workplace satisfaction is the confidence that their work will be useful, productive and will lead to the development of their team and their institution. Thus, 81% of respondents answered that their work makes an important contribution of the entire department. Therefore there is no great desire to try other careers (77% gave a negative answer concerning a career change).

However, they do not wish this career for their children or other close ones, perhaps compared to other areas that are currently developing better and are offering more benefits (IT, services, etc.).

As mentioned above, there are areas adjacent to the medical system where doctors working with double majors work, like medical equipment and drugs sales or development of informational systems for hospitals and patients.

At question number 12, referring to the benefits, we received unexpected answers, meaning that the top preferences regarding the desired benefits are mentioned: retirement benefits (51%), annual leave (49%), assistance care (39%) and, of course, a flexible work schedule (50%). A very small number (10%) responded that they do not consider improvements necessary in this regard.

Other surprising answers, knowing the current situation and trend of migration of doctors were the question of looking for a job. 43% replied that they are not seeking other position and 36% said they would only apply if an opportunity arises.

We can conclude, by analyzing the responses received so far, that there is both a state of insecurity and a lack of information regarding the activity of young doctors in Romania. The responses we see, confusing and sometimes contradictory, make us believe that the development and pursuit of a career plan, in short and medium term is almost impossible. Similar results were obtained from other research on salary and job satisfaction (Rotilă; Viorel, 2013).

The responses received lead to the conclusion that the respondents did not choose a physician career under the influence of friends or acquaintances, nor out of a certain "obligation". Their parents career was not a factor of great influence, only 17% of respondents answered that it mattered a lot, and 31% said they were just a little influenced. Also, and encouraging aspect, teachers had a particular importance in choosing their careers, a sign that while controversial in recent years, the role of the educational institutions and of teachers in the development of young people is very high. Therefore, 29% of respondents said they were very much influenced by teachers, and 45% a little influenced by them. If about their medium's influence, within their family or friends, the answers were not positive in a large proportion,

respondents were strongly influenced by their school mediums, teachers, field visits and discussions with people in the field.

In terms of their choice of employment, its location relative to their home, the city center and other locations were not answers to denote significant influence (58% responded that they are not influenced by location).

We conclude that the large concern was thus to choose a job that provides the opportunity and the factors necessary for professional development, personal development, career advancement and deepening of knowledge. As we have seen, the majority of respondents were working in the public health system, meaning that they work in public hospitals in Romania (in the present case, Bucharest). We infer therefore that the choice of a good hospital, renovated, equipped with advanced equipment for diagnostic and treatment, with a productive management is preferred even if they are in remote or difficult to access locations. They preferred jobs and institutions that are offering higher wages. Moreover, nearly 75% of respondents chose this career and to achieve competitiveness thresholds in this field based on the possibility of obtaining a higher salary compared to other fields.

To the questions related to career choice, preferences for the medical field and having the qualities required to practice medicine we received mainly positive responses (86% of respondents said that they wanted this career from the beginning) and also said in large proportion that they consider themselves suitable for this career, being active, responsible people, willing to be challenged.

According to the national distribution of specialties, respondents were from dominant specialties: general medicine and surgery, followed by the rest of the specialties: dermatology, psychiatry, pediatrics.

Question 13, the last question, refers only to the factors that motivated respondents to choose a career in the medical field. As a first and important observation the salary was not a factor in the decision, which shows that in the beginning the choice for a medical career is based primarily on factors such as membership in a growing environment or an environment with challenging situations and tasks, while financial benefits occupy second place.

We can say that, according to observations made over time, the medical career was of interest to those who have many different expectations, but certainly not financial ones. It also notes the importance of working in a prestigious public hospital or a reputable private clinic.

The main choices regarding motivation in making a decision for a medical career, in Romanian institutions, include: providing opportunities for training and career development counseling (72%), reputation of employing company (63%), opportunity to face challenging and meaningful tasks (61%). We can also ascertain the desire and the doctors' tendency to prepare for an international career (55% of respondents chose as motivating element the opportunity to develop a career outside the country). In terms of choosing a proper job, and by that we understand the inclusion of young doctors and residents in well equipped hospitals, with opportunities to practice their craft at high standards, respondents highlighted as important elements like job security, promotion opportunities, with an emphasis on organizational culture and values.

Another topic increasingly discussed lately, covering all fields, refer to balancing professional life and personal life (61% preferred work-life balance, while 51% have focused on the system of rewards offered).

Even if the medical profession requires a certain imbalance between home life and the work program of a hospital, there seems to be a constantly growing interest in reducing this imbalance and promoting the allocation of more time for personal and family life.

3 Conclusions

In terms of performance correlation with satisfaction and compensation, by interpreting the results received we did not find a very close relation, so performance in the medical career in Romania is not directly linked to remuneration and satisfaction in the workplace. Therefore, as we showed before, choosing a career in the medical field depends less on pay and benefits than on providing non-salary benefits like the possibility to provide ongoing personal development programs and environments aligned with international standards.

The results of our research are consistent with what is currently going on in the research field as it tries to find some correlations as appropriate as possible in this respect.

"Research, promising at the start, led to great disappointment, proving that between satisfaction and performance there is not a simple and solid relationship and that job satisfaction is often less important in determining professional behavior than initially thought. Moreover, even where a positive correlation between satisfaction and productivity exists, we concluded that it is not always clear whether satisfaction and positive attitude, built on this basis, determine a rather high productivity or vice versa, high productivity generates high morale (satisfaction). Research in this area are ongoing and experts shall, in this context, develop patterns of correlation between productivity and satisfaction." (R; Emilian, Tigiu, G, 2004)

We conclude saying that according to the statistical tests the performance of physicians depends to a very small extent on how they are paid and on job satisfaction (more precisely, a 1% increase in performance is given a simultaneous increase in the remuneration of 0.45% and in satisfaction of 0.32%).

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The role of ICTs in enhancing the service sector productivity in Palestine

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1 Introduction

Information and communication technology (ICT) is undeniably a vital engine for economic growth in developed economies. It supports economic development through productivity enhancement, innovation and trade development (through new delivery processes). Moreover, ICT is expected to contribute to economic recovery by providing relevant solutions to the current world economic crisis.

In most developing countries, the ICT sector as a stand-alone economic sector is still under-developed compared to the ICT sector of countries which are part of the knowledge economy. Both the public and private sectors in developing economies are still consumers of technologies developed abroad and not ICT producers and innovators. However, over the past 20 years, some developing countries such as India, China, Malaysia and Turkey have improved their capacity to use the ICT sector as an important tool for economic development, in a way that sometimes exceeded the capacity of developed countries. The impact of ICT in developing countries depends on the synergy between ICT investment and long-term economic growth and stability. Moreover, ICT productivity depends also on the human capital development related to ICT usage skills. The adequacy of ICT investment and the efficiency of human capital were behind the significant improvement in the quality of life for large segments of people in countries like Vietnam and India.

Studies at the firm level provide controversial evidence that ICT implementation has positively affected the growth in productivity (Strassmann 1985, 1990; Bender 1986; Franke 1987; Gargallo-Castel and Galve-Goriz 2012). Despite the fact that the service sector is more ICT-intensive than the manufacturing sector (OECD, 2003), evidence of the ICT productivity from the service sector of developing countries is rare (UNCTAD, 2008; Meng and Li, 2002). Although increasing over the last few years, the limited number of studies on this issue mainly addresses countries characterized by a rapid ICT growth like China, India, Malaysia and Turkey. Regarding other underdeveloped countries, the relationship between ICT on the one hand, and productivity and economic growth on the other hand need more attention by researchers and policy makers.

This paper addresses this relationship for a special case of under developed economy i.e. Palestine where the economy is largely affected by the colonial measures of a military occupation. Palestine was forced to split into three distinct areas namely West-bank, Gaza, and Al-Quds. Despite the relative autonomy in economic decisions Palestine gained in 1993, this autonomy is very limited when it comes to inter-trade between the three areas. Other restrictive measures apply to foreign trade and to the use of third and fourth generations of mobile services to mention few.

In the course of the past twenty years, Palestine has experienced a high growth in its service sector, in comparison with manufacturing and agriculture sectors. The contribution of the service sector to GDP grew steadily, shifting from 50% in 1995 to 60% in 2009, and it now employs more than 65% of the labor force. However, the Palestinian economy experiences a weak productivity growth in the service sector in comparison with the manufacturing sector, which negatively influences the overall productivity growth of the Palestinian economy (Morrar and Gallouj, 2013).

In the last decade, Palestine has experienced a particular and continued increase in the utilization of ICT at the firm-level, especially in terms of computers, cellular subscriptions, Internet Wi-Fi, and networks. This is mainly due to the fast growth of the ICT sector in Palestine in the last two decades. The productivity of the service sectors which use more ICT is likely to grow higher compared to sectors which are low ICT-intensive (Morrar and Gallouj 2013).

In this work, the straightforward relationship between ICT and productivity growth of service firms is investigated in a very original context. Palestine is a country where data are lacking, The country is divided into 3 areas (Westbank, Gaza, and Jerusalem); each with its own political and economic condition, and has to support colonial and military restrictions. ICT can help to connect the different areas and to bypass many of these restrictions especially for service businesses. The remaining of this paper contains the following sections. Section two reviews the literature devoted to the relationship between ICT and economic performance at different levels of analysis: macroeconomic level, industrial level, and firm level. In section three, we present some statistics about the ICT sector in Palestine and its applications in the service sector. Section four discusses the empirical method (methodology used and data). In section five results are presented and discussed. The last section concludes the study.

2 Literature review

Theoretically, the channel by which ICT affect economic development is through building “knowledge based economy” and “information society”, in which information is an essential input for business processes and economic development. In practical terms, this happens through the employment of ICT tools which includes hardware, software, office automation, internet service, and telecommunication.

The relationship between ICT and economic performance has been extensively analyzed in the literature (Brynjolfsson and Yang, 1996; Motohashi, 1997; Kraemer and Dedrick, 2001; Jalava and Pohjola, 2002 ; Farhadi et al.

2012). While the results are overall mixed, most of the evidence after the mid-1990s confirm a positive impact of ICT on economic performance. Most of the early studies focused on measuring the impact of using computers on labor productivity ignoring the effect of non-computer ICT. One of the limitations to the realization of such studies was the availability of data.

Nevertheless, there is now a growing consensus about the positive relationship between ICT and labor productivity (Koellinger, 2006). This positive impact comes mainly from three sources (Pilat, 2004). First, it is due to the impact of ICT on capital deepening, which enhances labor productivity. Second, more production of ICT products is likely to increase the efficiency of labor and capital, or multifactor productivity in the ICT-producing sector. And third, using more and more ICT helps firms to increase their overall efficiency, for example, through lowering transaction costs, speeding innovation, increasing access to information and knowledge.

Empirical studies about the relationship between economic growth and the using of ICT are classified into three levels of analysis: macro, industrial, and firm level. At the macro level, Aghaei and Nasab (2009), Schreyer, et al. (2003), Van Ark, et al. (2003) and Jorgenson (2003) found that ICT investments increased capital and improved the growth in most OECD countries, taking into account the variation between countries. Oliner and Sichel (2000) using computer hardware, software and telecommunication equipment as indicators for ICT found a high impact of ICT on economic growth starting from mid-1990. In a similar study, Javala and Pohjola (2002) found that ICT was one of the most important factors in the U.S economic growth in the 1990s. There is a gap between developed states themselves. For instance, Daveri (2000) and Schreyer (2000) found that the contribution of ICT to economic growth is higher in USA than in EU.

At the industrial level, several studies showed that the growth in ICT sector significantly contributed to labor productivity and MFP in many developed countries. O'Mahony and Van Ark (2003), Pilat, et al. (2002) and Pilat and Wölfl (2004) found that in the service sector, ICT-based services rapidly grew in some developed countries like USA, France and Australia compared to other developed countries, which substantially enhanced the growth of labour productivity and MFP.

Compared to the two other levels, firm-level analysis is likely to be more rigorous in measuring the relationship between productivity and ICT usage. Firm level data can reveal the factors influencing the effect of ICT that cannot be captured at the macro or aggregate level, e.g. skills, organizational competences, and entrepreneurship. Also, firm level analyses consider the competitive impacts of ICT, e.g. the entry and exist of new firms and market share.

In this view, Atrostic and Nguyen (2002) found that using computers led to a 5% increase in manufacturing firms' labor productivity in USA. Arvanitis (2004) found that there is a high correlation between labor productivity and ICT investment at firm level in Switzerland. Atrostic and Nguyen (2005) used two different computer-related measures: computer capital and computer networks (how computers are used) to measure the relationship between ICT and labor productivity in the U.S manufacturing firms. They also found that computer networks added 5% to labor productivity in comparison with 12% in case of investment in computers (computer capital). Criscuolo and Waldron (2003) using a panel of manufacturing firms in UK, found that using E-commerce enhanced labour productivity between 7 to 9%. Gretton et al. (2004) using a firm-level data from the Australian firm found that ICT raised the annual growth of MFP by nearly two-tenths of a percentage point. Maliranta and Rouvinen (2004) found that the productivity of ICT-equipped labor increased by 8-18% in Finland after controlling specific firm and industry characteristics and also time effect. This effect was clear in ICT-producing services.

The influence of ICT investment on productivity growth varies greatly between sectors (e.g. industrial vs. service sector) and countries (e.g. developing vs. developed countries). Despite the consensus about the positive impact of ICT on productivity in developed countries, there is no consensus on ICT effect in developing countries. Dewan and Kraemer (2000) using panel data for 36 developed and developing countries between 1985-1993, found that the investment in IT capital has positively affected the output growth in developed countries, but this was not the case for developing countries. They attributed this gap to the low rate of IT capital in developing countries as well as to the lack of complementarity assets like human capital, infrastructure, and knowledge based structures. Edquist (2005) attributed this gap to the late introduction of ICT in developing countries. For example, until the late 1990s, Internet service was not found in many developing countries. Some studies revealed a negative impact of ICT on productivity. Lehr and Lichtemberg (1999) explained this negative impact by the limitations of using simple bivariate relationships, while Becchetti et al. (2003) attributed it to the lagged effect of ICT investments and its association with labor network externalities.

Thailand is one of the developing countries where the ICT was put in the core of government policies. It has considered ICT as a vehicle for social and economic development which plays a vital role in improving the competitiveness of domestic businesses (UNCTAD, 2008). Therefore, it has established the National Information Technology Committee in 1992 to promote ICT including members from both public and private sectors (Thuvasethakul and Koanantakool, 2002). Results of productivity analysis for Thai firms show that using computers and Internet as well as web presence are associated with high growth in labor productivity represented by sales per employee (UNCTAD, 2008). They also show that the effect of computers on productivity are higher than that of Internet and web. Computers' influence on productivity comes from their intrinsic characteristics such as storage capacity and processing and from their use as means for acquiring other complex ICT services such as Internet access and web presence.

Many studies confirm the importance of complementarity between ICT investment and other investments. The impact of ICT is apparent when ICT investment is accompanied by other investments and changes, i.e. "ICT primarily affects firms where skills have been improved and organizational changes have been introduced" (OECD, 2003).

In Canada, Baldwin et al. (1995) found that employment of advanced technology requires higher level of skills requirement. Gretton *et al.* (2004) also found that human skills, new innovation processes, advanced business practices and the application of new organizational changes are crucial for Australian firms to generate a positive influence of ICT investment on productivity growth. In France, Entorf and Kramarz (1998) explained that higher labor productivity is associated with more experience in using computer-based technologies. Charlo (2011) found that the innovation has no significant impact on productivity growth in manufacturing firms in Uruguay, but this is reverted when innovation interacts with investment in ICT. In a similar study, Koellinger (2006) suggested that innovative firms which invest in ICT are more likely to exhibit an increase in labor productivity, which confirms the importance of complementarity between ICT investment and other investments in innovation and human capital.

ICT is likely to be more employed in the service sector than in manufacturing (OECD, 2003). Moreover, there is a high intra-sectoral heterogeneity in terms of ICT intensity within the service sector. For example, financial services in many countries are among the service sectors that intensively employ ICT (OECD, 2004). Evidence from UK shows that financial intermediation is highly dependent on network technologies, much more than other service sectors (OECD, 2003).

More evidence related to services includes Gretton et al (2004) who found a positive impact for ICT on MFP growth in many of service sectors in Australia and United States. Also, in USA, Doms et al. (2002) found that the replacement of traditional retailers by sophisticated services in the US retail sector over the 1990s was contingent with introducing new technologies and processes (and especially ICT). Maliranta and Rouvinen (2004) found that the impact of ICT on labor productivity in Finland was higher in the service sector than in manufacturing. A similar result was found in Switzerland by Arvanitis (2004) who found that the employment of Internet in the service sector was more important for service firms' performance than for the manufacturing firms. This is explained by the unavailability of a desk job equipped by PC and Internet connection for many of the employees in the manufacturing sector. Farooqui (2005), using a sample of service and manufacturing firms, found that the impact of e-selling on labour productivity reveals positive sign in service firms (it boosts labor productivity by 4%) and negative sign in manufacturing firms. Hempell et al. (2004) confirm the importance of complementarity between ICT investment and innovation to obtain a positive impact of ICT on labor productivity in the service sector in both Germany and the Netherlands.

3 The ICT sector in Palestine

The Information and communication technology sector is gaining more and more recognition in Palestine. Economic experts commend ICT sector in Palestine for its viability and ability to prompt economic development and sustainable growth¹⁹⁹. ICT sector in Palestine gains its advantage from the specificities of Palestine economy: small with a young and well-educated population.

In recent years the ICT sector significantly expanded in terms of the number of firms, and foreign investments. The output of the ICT sector was estimated at \$588.9 million in 2010 by the Palestinian Central Bureau of Statistics (PCBS). In 2011 the contribution of ICT sector to Palestinian GDP increased from 0.8% in 2008 to 6.4% in 2011. A recent study by the Palestinian IT Association of Companies (PITA) confirms that international experts attested that outsourcing ICT services from Palestine is evaluated positively in terms of levels of quality, timeline and customer satisfaction.

The growth of the ICT sector is due to the change in the trend of many sectors to the modernization and novelty. Thus, ICT is employed in most of the productive sectors and along the supply chain of most companies. Meanwhile, national agencies such as USAID²⁰⁰ and GIZ²⁰¹ start supporting the ICT sector in Palestine as an official sector which will give new impetus for the growth and development.

3.1 The history of the ICT sector in Palestine

The Palestinian ICT Cluster Assessment (2006)²⁰² provides a brief background description and history about the ICT sector in Palestine. During the 1980s, the ICT sector was represented by a handful of companies which mainly distribute the services provided by Israeli dealers and had a limited experience in ICT services. Some software companies were involved in developing accounting-related packages to replace the Israeli accounting software programs used by local companies and hospitals.

In the 1990s and after the Oslo agreements, the ICT sector started to grow in response to the demand coming from the private sector (financial and insurance sector, telecommunication, etc.), local government, public administrations, universities and NGOs. The launch of the first telecommunication company (PALTEL) in 1997 highly contributed to the development of the ICT sector in Palestine. The Palestinian Internet service provider was also created and Internet

¹⁹⁹The Palestine ICT Cluster Assessment is an industry report published by USAID

²⁰⁰United States Agency for International Development

²⁰¹German Society for International Cooperation

²⁰²The Palestine ICT Cluster Assessment is an industry report published by USAID

became accessible to different stakeholders. By 2012, PALTEL had around 382,700 subscribers to fixed line and 165,000 to ADSL lines.

The ICT activities and the market demand are mainly concentrated in three areas: Ramallah, Gaza and Jerusalem. The main products of ICT firms are hardware products (direct agents or PC assemblers), software development, enterprise consultancy and Internet services and office automation equipment²⁰³.

During the 2000s, there is a sharp decline in ICT companies revenue from US\$ 120 million in 2000 to US\$ 87 million in 2003, because of the political instability of the second Intifida in 2001. Moreover, International companies such as HP, Timex and IDS shut down their sales operations in Palestine.

A report conducted by the Palestinian IT Association (PITA) in 2009 shows that 29% of ICT firms are mainly developing software, 28% are engaged in hardware sales, and 5% in manufacturing ICT products (Wihaidi, 2009). By the end of 2005, there were around 100 ICT companies, 150 Internet cafes and 150 computer stores in the Palestinian areas.

PITA statistics also show that, at the end of 2007, the ICT sector contributed about 10-12% of GDP with \$500 million market size. There were around 250 ICT firms, and over 5300 individuals working in the ICT sector. In 2009, according to World Bank database, ICT services exports increased from 5.4% of total Palestinian service export in 2008 to 6.0% in 2009. In 2010, there was a growth in the software development firms which represented 36% of ICT firms, whereas hardware firms, telecommunication firms and training firms represented 35%, 18% and 11% respectively (PITA, 2010). The number of employees increased to 6,400 in 2011 (PCBS, 2012).

3.2 The structure of the ICT sector in Palestine

Goods and services introduced by ICT companies in Palestine extend from telecommunications (fixed and mobile phone lines, Internet services, etc) through computers developers, equipment manufacturers and resellers, storage, and audio-visual systems, production of software for solutions and packages (projects and sales management, finance and accounting programs, education-related solutions, children education and entertainment, etc) to web products (web development, e-businesses, web portals development, ICT consultancy, etc).

3.3 Local demand for ICT

The demand for ICT goods and services has significantly increased in Palestine over the last few years as illustrated by Table 1.

In 2012, the PCBS developed the ICT Business survey, which mainly aims to provide a comprehensive statistical data about the main features of ICT means, accesses and usages in the Palestinian firms across the different economic activities. It also provides a statistical information for decision makers either in the public or private sector.

Table 1. Percentage of households with IT goods and services.

	2004	2011
Computer	26.4	50.9
Internet connection	9.2	30.4
Fixed phone line	40.8	44
Mobile phone	72.8	95

Source: PCBS (2004, 2011)

3.3.1 Usage of computer

Table 2 shows that 47.0% of the total number of firms in Palestine used computers in 2011. West bank has an advantage in the use of computers compared to the Gaza Strip (49.6% vs. 40.8%). The number of computers per 100 employees in Palestine is 22.3.

Table 2. Percentage of firms with IT goods and services.

Indicator	Region		
	Palestine	West bank	Gaza
Percentage of firms using computers	47	49.6	40.8
Percentage of firms using Internet	39.2	41.3	34
Percentage of firms using electronic transactions	11.2	10.8	12

²⁰³ <http://www.primuspalestine.com/>

Indicator	Region		
	Palestine	West bank	Gaza
Percentage of firms have Website	4.8	5.2	3.7
Percentage of firms engaged in R&D in ICT	2.5	1.5	5
Number of computers per 100 employees	22.3	21.5	25
Number of telephones per 100 employees	25.9	26.4	24.1
Number of mobile phones per 100 employees	40.2	37.3	50.3

Source: PCBS (2011)

There is also a high heterogeneity between economic sectors regarding computer use. Table 3 shows that financial intermediation firms and information and communication sectors are the main users of computer with 97.1% and 92.6% respectively using this tool. These percentages are consistent with the basically informational nature of these sectors.

The percentage of firms that use computer in the overall services is 50%, which is explained by the inclusion of service activities which are less ICT intensive like hotels and restaurants, sales and repair of motor vehicles, wholesale trade and public service. The industrial sector is characterized by the lowest score in terms of Internet use. This is related to the nature of the industrial sector in Palestine which mainly consists of traditional industries that mainly employ non-skilled labor.

Table 3. Percentage of firms that use computers by economic sector (activity) in 2011.

Economic sector	Percentage
Industrial	26.3
Constructions	90.1
Internal trade	49.9
Services	50
Transportation and storage	32.3
Information and communication	92.6
Financial intermediation	97.1

Source: PCBS (2011)

3.3.2 Usage of Internet

Table 2 shows that 39.2% of firms accessed Internet services in 2011, 41.3% in West Bank compared with 34.0% in the Gaza Strip. The lower rate of internet access is explained by the difficult political situation in Gaza which negatively affects most economic sectors and impede the ability of many firms to develop and employ ICT.

Regarding the differences between industrial and service sectors in using Internet, Table 4 shows that the gap between industrial and service sectors is lower in comparison with the gap in the use of computers. Information and communication and financial intermediation sectors are also the highest among other sectors in using internet in 2011 with 99.3% and 97.8% respectively; only 65.3% of industrial firms employ internet in 2011. According to PCBS, in 2011, 86.5% of the firms do not use Internet because it is not employed in their production processes, while 18.4% do not use it because of its cost.

Table 4. Percentage of firms that use computers by economic sector (activity) in 2011.

Economic sector	Percentage
Industrial	65.3
Constructions	92.1
Internal trade	85.8
Services	81.5
Transportation and storage	75.8
Information and communication	99.3
Financial intermediation	97.8

Source: PCBS (2011)

3.3.3 Electronic Commerce

Table 2 shows that 11.2% of firms in 2011 carried e-commerce transactions, with low difference between West Bank and the Gaza Strip (12% in Gaza vs. 10.8% in West Bank). According to PCBS, in 2011, information and communication technologies and financial intermediation were the main user of electronic transactions with 55.9% and 36.7 of the firms respectively. 31% of industrial firms used electronic transactions, which is considered a good ratio regarding the low implementation of E-commerce in Palestine. Only 4.8% of firms had a website (5.2% in the West Bank and 3.7% in the Gaza Strip).

3.3.4 Telecommunications

Table 2 reveals that the number of mobile phones in the firms was 40.2 mobiles per 100 employees in Palestine in 2011 (37.3 in West Bank and 50.3 in the Gaza Strip). The number of fixed telephones per 100 employees was 25.9 in the Palestinian firms at the same period.

The ICT business survey of PCBS shows that in 2011 around 70% of firms in Palestine use mobile phones to get information about goods and services, 46.5% to provide customer services, 31.2% to access banking or other financial services and 23.3% to interact with general government organizations. Only 9.2% of firms use mobile phones to access the Internet and 10.1% to send/receive E-mails.

3.3.5 Research & Development (R&D)

The same data from PCBS show that only 2.5% of firms in Palestine performed R&D activities related to ICT in 2011. This might be explained by the low concern in R&D either from the private or public sector and by the fact that most of R&D related to ICT in the Palestinian firms is developed out of Palestine. The R&D sector is the smallest sector in the Palestinian economy and it mobilizes a too weak amount of financial resources (Morrar and Gallouj, 2013).

Sectoral differences also manifest in R&D activities related to ICT. Around 32% of firms in the information and communication sector implemented R&D related to ICT, 21% in financial intermediation. Only 1.6% of industrial firms engage in R&D related to ICT. This confirms what we already outlined i.e. that the industrial sector in Palestine is a traditional sector with low employment of technology and of skilled labor. Furthermore the Israeli restrictions against the Palestinian economy makes the investment in R&D a non-profitable activity.

4 Methodology and empirical approach

In this section, we develop an econometric approach to analyze the relationship between ICT use and labor productivity in the Palestinian service sector. The model for estimating the complex relationship between ICT and economic performance should take into account that the relationship between ICT and economic development is a multi-dimensional process which must be discussed in several perspectives (e.g. economic, social and human development). Moreover, it must be based on a robust blend of both qualitative and quantitative data.

This paper adopts the productivity approach used in many previous studies (Gurbaxani et al., 1998; Ramirez et al., 2001). A Cobb-Douglas production function is used as the basic analytical framework as it is simple and it has empirical robustness in estimating firm performance. The logarithmic transformation of the Cobb-Douglas function provides a log-linear form of the production model as follows:

$$\ln(Q/L) = B_0 + B_1 \ln(ICTlabor) + B_2 \ln(Capitaintensity) + B_3 \ln Telecom + B_4 * CompNet + B_5 * E-commerce + B_6 * R\&D + B_7 * ICTlab * R\&D + B_8 * Website + B_9 * \ln(Exports) + B_{10} * \ln(Size) + B_{11} * Gaza + B_{12} * Quds + U_i$$

The dependent variable is productivity which is proxied by labor productivity. There is no consensus as regards the most relevant index for measuring labor productivity. It has been commonly measured in the literature using value added per employee or sales per employee. Value added is considered a more accurate measure of labor productivity because it subtracts the cost of intermediate consumption from the value of the sales. Therefore, we have used the logarithm of value added per employee to proxy for the labor productivity. *ICT labor* is the logarithm of the ratio of labor using ICT to total number of employees. The labor using ICT is proxied by the number of employees using computers during their work. *Capital intensity* is measured by the logarithm of the ratio of book value of assets to the total number of employees. *Telecom* is a dummy variable which equals 1 if the firm uses smart mobiles for activities other than sending and receiving calls. These activities include Internet access, emails, banking services, governmental services, offering goods and services and other activities that can be performed using smart-phones. *Comput* is the natural logarithm of the number of computers used by the firm. *Network* is a dummy variable that equals 1 if the firm has computer network of any type. *E-commerce* is a dummy variable that equals 1 if the firm uses the Internet to acquire information about goods and services, provides information about goods and services, buys goods or services online, or uses Internet banking services. *R&D* is a dummy variable that equals 1 if the firm implements a research and development project, and 0 otherwise. *ICTlab*R&D* is an interaction variable that measures the complementarity between R&D and the number of employees using ICT. *Website* is a dummy variable which equals 1 if the firm has a website. *Exports* is the natural logarithm of the export sales of the firm. *Size* is the logarithm of the number of

employees; *Gaza* is a dummy variable which equals 1 if the firm works in the Gaza Strip. *Quds* is a dummy variable which equals 1 if the firm works in Jerusalem.

4.1 Data and Sample

We will use firm-level data to investigate the relationship between ICT and labor productivity in the Palestinian service sector. Using firm-level data is advantageous over macroeconomic and industry level data (OECD, 2004) because it helps in understanding why high ICT investment may not led to high growth in labor productivity (Solow paradox), as it can highlight the factors (skills, organisational factors, etc) which influence the relationship between ICT and productivity and can not be observed at the aggregate level.

Secondary data about both the dependent and independent variables are obtained from the PCBS. In 2012, PCBS implemented the ICT business survey for the first time to provide a statistical information about the use of ICT at both household and business levels in 2011. After data manipulation a total number of 793 service firms will be used to measure the relationship between ICT and labor productivity in the Palestinian service sector.

5 Results and discussion

Table 5 summarizes the results of the regression equation estimation. Four models are estimated using OLS based on the specification presented in the last section. Standard errors for the regression coefficients are robust for heteroscedasticity using White's method. The adjusted R-square for the four models varied between 0.15 and 0.259 which means that they explain around 15% to 26% of the change in the growth of productivity. Model 4 has the highest value of adjusted R^2 compared to other models. In model 4, most of the ICT indicators have positive impact on labor productivity for the Palestinian service sector. This is consistent with previous findings which outline that in order to increase their contribution to productivity, service sectors should invest far more heavily in new technologies, mainly ICT (Morrar and Gallouj, 2013 for the case of Palestine, see also x and y for the case of other developing countries like Thailand and India).

Table 5 shows that firms which use Internet for selling and purchasing services (*E-commerce*) achieved larger productivity scores than firms which do not use *E-commerce*. Possible explanations for this result may refer to the increase in the use of Internet by financial services and information and communication services. *E-commerce* can influence the business process by enabling the firm to access wider markets and new customers, by increasing the efficiency of business processes, and by allowing a cheaper and more efficient sourcing of materials.

The increase in *ICT labor* variable is found to improve the labor productivity. This is consistent with what Entorf and Kramarz (1998) underlined regarding French workers i.e. that they are more productive when they got more experience in using computer-based technologies.

The use of mobile phones in business activities including internet access, emails, banking services, governmental services, offering goods and services and other activities that can be performed using smart-phones. *Telecom* is found to be of high importance in improving the labor productivity of service firms. This can be understood once related to the high percentage of employees who use mobile phones to get information about goods and services (70%), to provide customer services (46.5%), and to access banking or other financial services (around 32%) (PCBS, 2011).

Despite the fact that 47% of service firms in Palestine use computers (Table 2), this paradoxically doesn't seem to lead to a positive impact on labor productivity. The regression coefficient for *Comput* variable is negative. This expression of the Solow Paradox might be explained by the lack of complementary assets like human capital, and knowledge-based structures. Employees in many service sectors like trade, hotels and restaurants, and personal services are nonskilled labor with very limited knowledge in computers and software.

R&D has a negative influence on labor productivity in the Palestinian service sector. This might be explained by the obstacles that limit the private sector in Palestine from benefiting from the results of R & D (El-Jafari et al. 2008): 1) the outcome of prepared research does not match the needs and requirements of the private sector, 2) the inability of research institutions to publish results of their research and studies, 3) research activity is restricted to universities in purely academic fields, 4) many of R&D activities in universities and research centers are not applicable, 5) lack of data and information. 6) the unappropriability of research methods to provide solutions to the problems faced by the private sector, 7) and the high costs of patents for many research studies.

The impact of ICT labor on labor productivity will improve if it is complemented by investment in R&D, which means that the R&D impact on firm productivity will be positive if it is complemented by labor with high intensity of ICT. This confirms the result underlined by Koellinger (2006) and Hempell et al. (2004) that innovative firms which invest in ICT are more likely to exhibit increasing labor productivity.

Table 5. Regression analysis for the ICT determinants of labor productivity.

Variable	Model 1	Model 2	Model 3	Model 4
<i>Size</i>	0.353*** (6.64)	0.331*** (6.09)	0.332*** (6.13)	0.550*** (9.164)
<i>Exports</i>	0.084*** (6.23)	0.064*** (4.53)	0.054*** (3.67)	0.050*** (3.327)
<i>E-commerce</i>	0.386*** (3.41)	0.393*** (3.50)	0.428*** (3.85)	0.557*** (4.757)
<i>Capital intensity</i>	0.084*** (3.49)	0.081*** (3.37)	0.079*** (3.38)	0.120*** (5.359)
<i>ICT labor</i>	0.338*** (5.50)	0.295*** (4.84)	0.204*** (3.01)	0.380*** (5.567)
<i>R&D</i>	-0.923*** (-7.15)	-0.819*** (-6.31)	-0.468*** (-2.66)	-0.058 (-0.338)
<i>Telecom</i>	0.350*** (2.86)	0.387*** (3.17)	0.374*** (3.11)	0.307*** (2.680)
<i>Gaza</i>		-0.524*** (-4.41)	-0.505*** (-4.26)	-0.536*** (-4.596)
<i>Quds</i>		0.424* (1.66)	0.480* (1.81)	0.703*** (2.892)
<i>ICT labor*R&D</i>			0.487*** (3.55)	0.554*** (3.967)
<i>COMPUT</i>				-0.389*** (-8.014)
<i>NETWORK</i>				0.031 (0.239)
<i>WEBSITE</i>				-0.167* (-1.875)
<i>C</i>	1.873*** (9.34)	1.967*** (9.61)	1.853*** (8.95)	1.706*** (8.354)
Number of observations	793	793	793	793
R-squared	0.157	0.182	0.193	0.272
Adjusted R-squared	0.150	0.173	0.183	0.259
F-statistic	20.964***	19.399***	18.737***	21.915***

All regressions are estimated using OLS regression. The numbers in parenthesis are robust t-statistic calculated based on White standard errors. ***, **, * indicate significance at 1%, 5%, and 10% respectively.

Our analysis shows that the use of websites by the firms do not improve their labor productivity. This might be related to the very low percentage of firms that have a website (only 4.8% in 2011 as appear in Table 2).

We also found that there is no significant relationship between using computer network and labor productivity. This is not consistent with works achieved in many other countries which confirm a positive relationship (Atrostic and Nguyen, 2002, Atrostic et al., 2004). In Palestine, this result might be explained by the fact that most of the service firms are micro firms (from 1 to 4 employees) or medium firms (from 5 to 9 employees) which are not able to employ computer networks or which are not in need for such networks.

For control variables, there is a positive and strong relationship between *Exports* variable and labor productivity which means that service firms which export are more productive than others. This positive impact of exports on productivity is highlighted by most of the literature whether it is concerned by developed or developing countries (Grazzi and Vergara, 2011; Calza and Rovira, 2011). In the last 20 years in Palestine the ratio of services to

industrial exports highly increased. According to PCBS statistics, it increased from 11.5% in 1997 to 46% in 2010 (PCBS, 2011).

As colonial measures divide Palestinian territories into three distinct areas, we investigate whether the geographical region has an effect on labor productivity. The convention of dividing Palestine into three separate areas is adopted by official statistics sources (PCBS 2012). The three areas are West Bank, Gaza and Jerusalem. Results in table 3 show that service firms which are located in Jerusalem are characterized by a higher labor productivity than the firms which are located in the West Bank and Gaza. This is explained by the special political situation of Jerusalem which is considered by the Israeli government as a part of Israel while the international community classifies it as occupied territories. Jerusalem is a tourist area where millions of tourists visit it yearly. Some service sub-sectors like hotels, restaurants, and transportation are more developed in Jerusalem than in the West Bank and Gaza due to the flourishing of tourism and free mobility of people and trade. This creates a high gap in demand between Jerusalem and the West Bank which positively impacts the labor productivity in the service sector of Jerusalem.

The low productivity of the service sector in the Gaza Strip compared with the West Bank is related to the very difficult political situation due to the blockade imposed by Israel and Egypt since 2006 which negatively impact all the economic sectors. Service sectors like financial services, wholesale trade, transportation, tourism and real estate have been hardly harmed by long years of blockade. Also, three Israeli wars against Gaza in 2008, 2012 and 2014 destroyed the infrastructure which is necessary for any economic development.

Finally, our analysis identifies a positive link between the size of the firms and their labor productivity. Large service firms in Palestine are characterized by a higher labor productivity than smaller ones. These large service firms include firms in telecommunication, financial and whole-trade sectors.

6 Conclusion

In this work, we have empirically addressed the question of the relationship between the use of ICT and the labor productivity in the Palestinian service sector. The results show that many of the ICT indicators have a positive impact on labor productivity. Using ICT (mainly Internet) in commerce (E-commerce) is one of the most important lever of labor productivity in service firms. The increase of the volume of ICT labor positively impacts the firm labor productivity. This means that service firms which are less ICT-intensive (for example in retail-trade, hotels and restaurant, sale and repair of motor vehicles) are less productive than more ICT-intensive firms (for example in telecommunication, real-estate, R&D and financial services). The use of mobile phones, for services other than send and receive calls, highly improves the labor productivity of service firms. This is related to the high percentage of employees using mobile phones for various purposes: to get information about goods and services, to provide customer services, or to access banking or other financial services. Conversely, it seems that using the website and computer network doesn't positively affect the labor productivity.

Regarding other control variables, our analysis underlines that large service firms achieve higher productivity levels than small ones, and that exports positively impact the labor productivity of service firms. Finally, regarding geographical differences in labor productivity, the analysis shows that firms in Jerusalem are characterized by a higher productivity scores than firms in the West Bank; firms in Gaza have a lower productivity compared to firms in the West Bank. This result is explained by the higher level of demand in Jerusalem and the hard political situation and blockade in the Gaza Strip.

Some policies need to be designed to enable the ICT sector, as a means of developing the Palestinian services, and applicable recommendations need to be made to policy makers to maintain the relationship between ICT institutions and the bodies of governance in a long-term economic strategy. First, financial and strategic commitments in governing institutions are crucial to support a knowledge-based economy. Second, the government should improve the fiscal and regulatory environment in ICT, through the reformation of ICT legislation (intellectual property rights, patents, etc), increased market competition, and tax breaks and domestic credit for ICT-intensive firms. Third, it should identify specific long-term plans for developing the service sector based on knowledge and ICT employment mainly in traditional services. Fourth, it is important to develop a closer link between public institutions represented by the ministry of Telecommunications and Information Technology and the ICT sector to develop the ICT infrastructure mainly in the Gaza Strip which was destroyed by the Israeli occupation. This requires the help of the international community to push Israel to allow for the Palestinian ICT firms to import the necessary equipment. Until now Israel does not allow Palestinian telecommunication firms to provide G3 Internet service for customers. Fifth, Service firms are necessary to build their future plans to be based on ICT usage, and employment strategy to depend on ICT-based labors. This needs the development of ICT infrastructure, more expenses on R&D activities related with ICT, and the increase in ICT training programs for present and prospective employees to offer more experience in using computer-based technologies. Sixth, it is important to denote the role of academics and research centers in delivering the vital role of ICT development in Palestine to policy-makers, in order to transform ICT strategies into real economic growth.

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ANNEX: QUESTIONNAIRE FOR IT SERVICE PRODUCERS IN CHILE

This confidential survey is addressed to Chilean information technology companies. Its purpose is to determine the role of Quality Certifications (*Certificaciones de Calidad*) for exports. The findings will be presented to public entities and associations, along with recommendations. We would like to thank you for your support. As soon as this survey is completed, we will send it to your email address. Your answers to this survey are very valuable to us. Thank you very much.

Mark a X in the box, or write your answers accordingly.

1. Name of the company (optional): _____
 2. Number of employees of the company (optional): _____
 3. Contact email address (optional): _____
1. In order to identify your company's size, ¿What is your company's total annual turnover? (in UF)
 - 2.401 – 10.000 ☐
 - 10.001 – 25.000 ☐
 - 25.001 – 50.000 ☐
 - 50.001 – 75.000 ☐
 - 75.001 – 100.000 ☐
 2. ¿Does your company export information technology services? If the answer is NO, would you want to export?
Please comment
 - Yes ☐
 - No ☐
 3. If your company exports, how long has it been exporting IT services?
 - 0 - 2 years ☐
 - 2 - 4 years ☐
 - 4 – More years ☐

If you were out of the export market, at what time and for how long was it: _____
 4. From your annual income, what percentage comes from IT services exports?
 - 0%-20% ☐
 - 21%-40% ☐
 - 41%-60% ☐
 - 61%-80% ☐
 - 81%-100% ☐
 5. ¿In the last 2 years, what have been the countries of destination of your exports?

 6. ¿In the short and long term, what countries would you like to include in your exports?

 7. ¿What sort of technological services are you selling on the domestic and/or foreign market? (and under what platform)

	Platforms								
	Microsoft	Unix	Linux	Oracle	IBM	SAP	Other		
Development and/or implementation of Software									
Customized development of Software									
Sales and Licenses of Software									
Infrastructure:									
• Hosting (shared hosting, cloud hosting, etc)									
• HouYesng									
• Data Center									
• Other									

• Techn. Market assessment									
• Other IT Consulting									
• Methodological assessment and Project management									
• Training									
• BuYesness Inteligencia									
• Other									
Systems Integration									
Support (Desk Services)									
IT Architecture									
Other									

8. What type of quality certificates does your company own and at which level is it? Regardless of whether you own a quality certification, which one would you like to obtain?:

	Obtained		In process	Desired / Future certification plan
	Year	Level of certification		
CMMI				
ITIL				
PMP				
ISO 20000				
ISO 27001				
ISO 22301				
ISO 9001				
Other				

9. What are your company's main incentives when it comes to obtaining a certification?

	YES	NO
Higher local market share		
Higher foreign market share		
Improvement and standardization of your processes		
Other (specify)		

10. For your business, What importance do you give to the following quality certificates? (regardless of whether you own or not a given certification)

	Very Important	Important	Neutral	Of little Importance	Not Important	No Opinión
CMMI						
ITIL						
PMP						
ISO 20000						
ISO 27001						
ISO 22301						
ISO 9001						
Other						

11. Do you have a clear knowledge of the importance of the quality certifications if the countries to which you export?

- Yes ☐
- No ☐

If the answer is YES, please note:

	Latin America	Canada and the United States	Europe	Asia - Pacific	Other
CMMI					
ITIL					
PMP					
ISO 20000					
ISO 27001					
ISO 22301					
ISO 9001					
OTHER					

12. In case you have obtained a quality certification in your company, what consequences would you say it had:

	YES	NO	NO INFORMATION
Sales increase			
Export increase			
Reduction of project's delivery times			
Cost reduction			
Other (specify):			

13. In case you have never obtained a quality certification in your company; do you perceive it has limited the company's development?

- Yes ☐
- No ☐

If the answer is Yes, explain why:

14. What are the main obstacles that prevent you from entering a quality certification process? Mention a few.

	YES	NO	No information
Financing			
Lack of knowledge of the benefits of certification			
Insufficient Human Resources			
Falta de Equipo Tecnológico			
Not enough time to invest in this process			
Other (specify):			

15. Has the public sector somehow supported you in a certification process?

- Yes ☐
- No ☐

If the answer is Yes, mention the programs or institutions that have supported you:

16. Would you like to add something?

Thank you very much!

Innovation with effectuation: an opportunity for the public sector

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This paper focuses on new innovation models in the public sector. It analyses the specificities of the public sector – institutionalism and professionalism – as the context of innovation. On the other hand, it argues that entrepreneurial innovation processes combined with the perspectives of learning and networking are well applicable – not only in the private companies – but in public institutions as well. Based on this view, the effectual approach, closely linked to service-dominant logic (SDL), is examined as a theoretical construct and tested in practice. An ‘effectual-type’ process, in which a city administration collaborates with citizens groups to foster the mutual expansion of resources, is described as a case and the characteristics showing analytical generalizability are identified.

1 Introduction

In recent decades, innovation has been considered crucial for fostering the economic growth and welfare. The background of this emphasis is the rapid rate of change and the significance of knowledge in present societies. In the public sector, a specific need for innovation emerges from the challenge of providing services in times of increasingly wicked problems and scanty financial resources. On the other hand, a strong tradition of innovation is missing the public context: innovations have been mainly incremental and isomorphic, representing continuous improvement (Albury, 2005; Sorensen and Torfing, 2011). Their aim has often been to ensure the stability (DiMaggio and Powell, 1983). Path dependence (Aagaard, 2012) and homogeneity have strengthened the ‘status quo’ in public institutions (DiMaggio and Powell, 1983).

Thus, the concept of innovation is a ‘newcomer’ in discussions of the public sector in spite of the continuous emergence of incremental innovations (Windrum, 2008). In addition to the small changes, systemic changes characterise the public sector. They are usually called with other terms than innovation – for instance, ‘reforms’ or ‘policy changes’ (Christensen, 2012; Hartley, 2005; Hood, 1991; Langergaard, 2011).

The role of innovation has been promoted by the proponents of the New Public Management (NPM), which is the dominant public paradigm in many Western countries. The missions of this paradigm are to improve efficiency by marketization, private-style management, entrepreneurship, performance standards, and output/outcome control (Christensen, 2012; Hood, 1991; Pollitt, 1993; Tummers, 2013). While public services have traditionally been authoritative, rule-based and supply-driven aiming to ensure equity (Torfing and Triantafyllou, 2013), NPM highlights deregulated and demand-driven services aiming to ensure efficiency and user satisfaction.

During recent years, a new framework of Network Governance (NPG) has been emerging parallel with NPM. It highlights inter-organisational cooperation (Osborne et al., 2012; Sorensen and Torfing, 2011). NPG assumes that working across organisational, professional and political boundaries will enable more efficient and effective policy implementation and service delivery (Christensen, 2012). In the framework of NPG, innovations refer to both transformational changes and continuous improvement (Hartley, 2005). They may occur at central or local levels in the perpetually changing context. NPG includes new tools to empower and engage stakeholders in the public problem solving and service production (Torfing and Triantafyllou, 2013). This ‘Post-NPM’ seems to be more about working together in a pragmatic and intelligent way than about formalised collaboration across organisational, institutional and public-private boundaries (Christensen, 2012; Sorensen and Torfing, 2011, 2012).

This study aims to provide additional insights to the practical ways in which the NPM and NPG approaches can be integrated in the context of public innovation. At a more specific level, we examine a process model that would foster this integration. A long-lasting dispute in innovation literature has been between the STI model (science and technology-based innovation) and DUI model (learning by doing, using and interacting). Our starting point is the latter, as it takes into account important aspects raised by the NPG approach. It highlights competence building in networks, interaction with users, and empowerment of employees (Lundvall, 2007). The DUI model reflects the broadening of the view on the nature of innovation, and it is near to the ideas of open innovation (Chesbrough, 2006) and innovation democracy (von Hippel, 2005). In managerially oriented research, it is near to the studies on user-based and employee-driven innovation (Kesting and Ulhøi, 2010; Sundbo and Toivonen, 2011), which have aimed to concretise the coevolving of innovation with everyday activities.

Demands for an innovative stance create a strong pressure to public institutions to find new entrepreneurially oriented ways of transforming services and service delivery. Here, the public sector will undergo a paradox: entrepreneurship is ‘a science’ of turbulence and change. It does not highlight continuity and does not exist in static conditions (Arend and Chen, 2012; Chiles et al., 2009), typical of the public sector.

We examine the approach of effectuation as an answer to the last mentioned challenge (Sarasvathy, 2008). The effectual approach has close linkages to the basic thoughts of service-dominant logic (SDL) developed by Vargo and Lusch (2004, 2008). It also relates to the public sector applications of SDL by Osborne et al. (2012) and has similarities

with the views on institutional work by Lawrence and Suddaby (2006). These linkages are important for the examination of the public sector as an institutional context for innovations and entrepreneurship. We focus on several characteristics of institutions: the role of the agency, institutional work, and the role of professionals in transforming institutional practices.

From now on the paper has been structured as follows. In the second section after this introduction, we analyse the theoretical literature, focusing on the two topics that are most relevant for our study: the public sector as an innovation context and the approach of effectuation as an innovation model. In the third section we present our empirical research: we first introduce the case and our methodology and thereafter analyse the results. The fourth section includes our concluding discussion.

2 Theoretical background

2.1 Public sector as a context for innovations

This literature-based sub-section examines the public sector as an innovation environment. We start by analysing the central characteristics of institutions and then continue to the characteristics of actors. The latter part of this sub-section focuses on the issues of transformation and practices.

2.1.1 *The characteristics of institutions*

The main characteristics defining innovation in the public sector are its political and institutional contexts (Seo and Greed, 2002; Windrum, 2008). The trend to more entrepreneurial and innovative way to produce services can be seen as a policy change in itself and may as such promote a big challenge to the traditional institutional context of the public sector.

As an institution, the public sector is defined according to rules, norms and beliefs which describe the reality of the institution/organisation (Hoffman, 1999; Garud et al., 2007), reduce uncertainty, and direct the behaviour and beliefs of the actors (DiMaggio and Powell, 1983; Dorado, 2005; Scott, 1995). Institutional elements are regulative, normative and cognitive. Rationality plays an important role in the creation of formal organisations (Meyer and Rowan 1977) and provides, together with cultural-cognitive elements and resources, stability and meaning for the organisation and its social life (Scott 1995).

Friedland and Alford (1991) have adopted the concept ‘institutional logics’ to describe the various practices and beliefs of institutions. Institutional logics provide ‘frames of reference that conditions actors’ choices for sense making, the vocabulary they use to motivate action and their sense of self and identity’ (Thornton et al., 2012, 132). This definition implies that *the change of the institutional logics* is a core phenomenon when a public organisation becomes more entrepreneurial and innovative.

In addition to rules and logics, the interrelatedness of institutions may have an impact on how various practices can be transformed. Interrelatedness refers to the relationships between different inter-institutional orders: family, community, religion, state, market, profession and corporation (Thornton et al., 2012). It demonstrates the partial autonomy of actors and organisations from other actors and organisations. The local community has a remarkable influence on how local institutions are enabled to change and transform their practices. The community embodies local understandings, norms and rules that become mental models upon which individuals and organisations define problems and situations (Marquis et al. 2007; Thornton et al., 2012).

Together with the interrelatedness, the complexity and multiplicity of institutional logics determine the possibilities to transform institutional practices. Institutional complexity describes situations in which divergent prescriptions from multiple institutional logics collide (Greenwood et al., 1996, 2011; Thornton et al., 2012). A multiplicity of logics is in play in any particular context (Greenwood et al., 2011), and its composition is constructed, not given (Thornton et al., 2012). This composition refines the agency as multiple and dynamic, and it looks at institutional work in the everyday practice of individuals coping with the institutional complexities of their work.

2.1.2 *Who is enabled to transform institutional practices*

Defining factors to transform institutions are 1) agency, 2) resources and resource mobilisation, 3) individual and institutional opportunities and 4) multiplicity, heterogeneity and the level of institutionalisation of the organisation (DiMaggio, 1988; Dorado, 2005; Seo and Creed, 2002).

Actors are only partially autonomous from the institutional structure (Seo and Creed, 2002). One crucial question is whether the institutional scripts and rules have been taken for granted (DiMaggio and Powell, 1983). Another issue is how the actors are able to change the institution (Lounsbury and Crumley, 2007). This is called ‘the paradox of embedded agency’ and it is closely connected to the concept of institutional entrepreneurship (Garud et.al, 2007). DiMaggio (1988) argues that ‘new institutions arise when organised actors with sufficient resources see an opportunity to realise the interests they value highly’. Actors reproduce and maintain practices within the existing institutional logic, but they also have capacity to innovate and to mobilise resources to transform institutions (Dorado, 2005; Thornton et.al, 2012; Scott, 2008).

The nature of agency has been theorised from various standpoints. Agency can be habitual (Giddens, 1984), strategic (DiMaggio, 1988), and sense making (Weick, 1995). All three forms are simultaneously involved in agency, but one dominates. According to Emirbayer and Mische (1998), social actions (including innovation) are influenced by the combination of temporally rooted orientations. These orientations may inform actors from the past (habitual orientation), the future (capacity to imagine alternative possibilities) and the present (capacity to conceptualise past habits and future projects within the contingencies of the moment (ibid.).

Referring to Emirbayer and Mische (1998), Dorado (2005) suggests that institutional actors can adopt three different kinds of profiles in changing an institution: entrepreneurship, convening, and partaking. Smets and Jarzabkowski (2013) apply the categorisation into iterative, projective and practical - evaluative dimensions. The projective dimension supports future change and entrepreneurial and creative behaviour (Battilana et al., 2009; Lawrence et al., 2009). In the dialectical framework, the human agency is conceptualised as praxis and positioned as the essential mediating mechanism that links institutional embedded actor, contradictions and change. According to Seo and Creek (2012, 240): 'The possibility of institutional change is rooted in the aptitude and opportunity for praxis.'

Individual actors have a remarkable role in changing and creating institutional practices. In spite of that, the nature of institutional entrepreneurship is not individual, but collective. For instance, Dorado (2013) highlights that institutional entrepreneurship is a group-bounded activity: groups motivate, inspire, and enable the engagement. Seo and Creed (2002) pose the question about the conditions in which socially embedded unreflective actors become conscious of the social arrangements in which their interests are unmet, mobilise other similarly situated actors, and take collective action for change. The starting point for change is the extent to which groups are dissatisfied with how their interests are accommodated (Greenwood and Hinings, 1996).

2.1.3 How institutions will be transformed

Lawrence and Suddaby (2006) have introduced the term 'institutional work' to describe how actors build, sustain and change institutions (cf. also Lawrence et al., 2009). The concept aims to focus attention, not on the social structures, but on the processes, i.e. move from the institution in itself to the purposive action. Institutional work can be described with three characteristics 1) institutional actors are reflexive, goal-oriented and capable, 2) actors' actions are the centre of institutional dynamics and 3) structure, agency and their interrelations are captured (Battilana et al., 2009).

Institutional work has been an umbrella concept (Hwang and Colyvas, 2011). It highlights the question of how actors become motivated and enabled to change the taken-for-granted practices and norms of the institution they are involved in (Smets and Jarzabkowski, 2013; Seo and Greed, 2002). According to Thornton et al. (2012), decision making, sense making and collective mobilisation are the key elements of institutional work. They link together the dynamics of practices and identities.

The concept of institutional work has pushed the institutional theory towards practice-based views. According to Lounsbury and Crumley (2007), practice should be understood as a kind of institution in itself, including material and cognitive activities that are evolved and shaped by the broader cultural framework. Here, activities are interpreted in the same vein with Jarzabkowski (2005) and Engeström, (1987): they are actions and interaction between actors as they perform their daily duties and roles. Practice refers to activity patterns that are infused with broader meaning and provide tools for ordering social life and activity (Lounsbury and Crumley, 2007). Practice is a members' phenomenon – something that actors draw upon, monitor and orient to in real time interaction (Llwelllyn and Spence, 2009).

Based on these views, it seems natural to conclude that *the concept of practice integrates innovation theories and institutional theories*. It also provides conceptual tools to understand innovation processes in the real life context of the public sector. The recent discussion about the 'practice-turn' aims to connect the micro-level of individual activities with the meso-level of organisations and with the macro-level of the broader organisational (and institutional) field (Suddaby et al., 2013).

Currie et al. (2012) link the concept of institutional work with the sociology of professions (e.g. Abbott, 1988) to highlight the role professions as institutional change agents. They link institutional work to the situation where the professional dominance is threatened. They focus on three issues. Firstly, how different types of institutional work interact and cross categories of creating or maintaining institutions. Secondly, how the social position or status of actors frames the institutional work they engage in (intra-professionally and inter-professionally). Thirdly, how the institutional work of 'theorising' by professional elites appears particularly significant.

2.1.4 Professionals as carriers of practices

In the neo-institutional theory, professionals are seen as key agents of the social change (DiMaggio and Powell, 1983, 1991). Lawrence et al. (2013) specify subjects to be professionals and other actors associated with the professions, actors from the top of organisations and the interaction of individuals. Professionals consist of several groups: 1) service professionals, including old and traditional professions and new 'weaker professions' (Ezioni, 1969), 2) professions seeking the professional status (Llwelllyn, 2001), and 3) professions managing services (Noordegraaf, 2011).

Professionalism has used to be one of the most trust-producing, formal public structures (Misztal, 2002). Correspondingly, professionals have been considered to be 'the anchors of the order, someone trusted and respected, individuals given a status, autonomy and social elevation' (Dent and Whitehead, 2002, 8). Public services have been

developed by the strong input of professionals whose status has been legitimised by the scientific knowledge. Professionals have had the monopoly to the knowledge, social status and autonomy to make decisions and to choose the right way to act according to the profession's moral and cultural code (ibid.). Professionals are also seen as bearers of important social values (Tummers, 2013).

Suddaby and Viale (2011) identify four essential dynamics through which professionals reconfigure institutions and organisational fields. Firstly, professionals use their expertise and legitimacy to challenge the incumbent order and to define a new, open and uncontested space. Secondly, they use their social capital and skills to populate the field with new actors and new identities. Thirdly, professionals introduce new rules and standards that recreate the boundaries of the field. Fourthly, they manage the use and reproduction of social capital within a field. Professionals aim to establish professional control (Freidson, 2001) and occupational closure (Abbott, 1988) to govern themselves and to block the outside interventions.

Within the new governmental context (NPM and NPG), professionals are expected to be entrepreneurial, creative, and efficient lifelong learners and team workers (Dent and Whitehead, 2002; Tummers, 2013). According to Du Gay (1996), the principle of the new governmental logic is to create a new professional and managerial subjectivity (cf. also Pollitt, 1993; Du Gay, 1996, 2007; Halford and Leonard, 2002). These requirements may be in contradiction with the traditional values and rules of professionals and force them to make sense of the change in relation to their practices and to the individual and professional identity (Emison, 2010). From the viewpoint of the employees, new entrepreneurial expectations connected with the new managerial work appear as an identity regulation.

The contradiction realises when knowledge, being the main property on which the professionals base their decisions and choose the means to act, becomes challenged by the demand to cooperate with other professions and citizens. From the service point of view, the question is of the ability of professionals to share and transform their knowledge (cf. Vargo and Lusch, 2008).

New practices may threaten the power and status of elite professionals in particular (Currie et al., 2012). The profession as an institution in itself demands stability, but innovation yields change (Emison, 2010). The expected changes do not take place without resistance (Wasserman et al., 2011). An additional challenge is that professionals have often difficulties to identify the policy programmes they are expected to implement (Tummers et al., 2009). It has even been argued that as a consequence of NPM, the relationships between politicians and professionals have moved from trust-based to a low-trust relationship (Windrum, 2008). The reactions of professionals to new demands are discussed from many perspectives in literature: NPM and resistance, managerial governance, the non-spread of innovations, and the professional self-regulation in a changing architecture of governance (Dent and Whitehead, 2002; Ferlie et al., 2005; Tummers, 2009).

Professionalization is a continuing process. DiMaggio and Powell (1983) regard this phenomenon as one important base that determines the isomorphic organisational change. Professionals transform services, but at the same time they transform themselves and their jurisdiction (Suddaby and Greenwood, 2005; Suddaby and Viale, 2011). Professionals are inhabitants of both the institution in question and the institution of their profession. In addition, they are citizens and inhabitants of their community. Professionals create and maintain these three environments/institutions but also disrupt them; simultaneously, they maintain and negotiate their roles and identities (Noordegraaf, 2011). They have to solve their relationships with the institution they work for, with their own and other professional groups, and with citizens and the community (Evetts, 2012; Noordegraaf, 2007).

2.2 Effectuation: a process with expanding cycles of resources

The approach of effectuation has its background in theories of decision making in situations of uncertainty, where decision makers are unsure about the consequences and preferences (Saraswathy, 2008; Saraswathy and Dew, 2005). These theories have also been important for the approach of service-dominant logic (SDL) in its foundational conceptualisation. For the specification of arguments of effectuation, an important source has been the empirical knowledge acquired from the behaviour of successful entrepreneurs. According to the developers of the effectual view, entrepreneurship is inextricably intertwined with uncertainty, i.e. entrepreneurial expertise means expertise in uncertainty (Read et al., 2009).

Effectuation operates through three logics when entrepreneurs produce new value (Saraswathy and Dew, 2005). These logics are 1) the logic of identity, 2) the logic of action and 3) the logic of commitment on stakeholders and value-creation. Each logic has complementary decision criteria: identity (who you are), action/knowledge (what you know) and commitment/network (whom you know).

Effectuation suggests the replacement of predictive logic with a means oriented approach to tackle uncertain market elements and to co-construct novel markets with committed stakeholders. It highlights that the cooperative shaping of the market, rather than a competitive scramble for (predicted to be) valuable resources, drives industry dynamics. The means oriented approach begins from available resources; goals emerge in the courses of action. An important point that the proponents of effectuation highlight is that any given resource can be made more or less valuable and more or less capable of producing long-term advantages: thus, *what people do with resources matters*. This approach clearly differs from the views that rely on linear processes, which start from the identification of an initial opportunity, set a goal, and aim to achieve it in a preselected market. (ibid)

Expanding cycles of resources characterise the activities in effectuation. There are three types of intangible resources with which the ‘effectuator’ co-creates new ends: new firms, new markets, and new products and services. These are co-created through commitments with a network of partners, investors, and customer stakeholders. Also the process of stakeholder acquisition is iterative and reflects the basic idea of expanding resources. Successful entrepreneurs usually build stakeholder relationships directly, one step at a time, as part of the process of creating a market, firm, or product. A result is that they are able to generate rich, first-hand knowledge related to the effort and will quickly have a sense of whether the business has real promise – relationships will create the market (Sarasvathy, 2008). Figure 1 presents the basic ideas of the effectual process (a simplified version from Read et al., 2009).

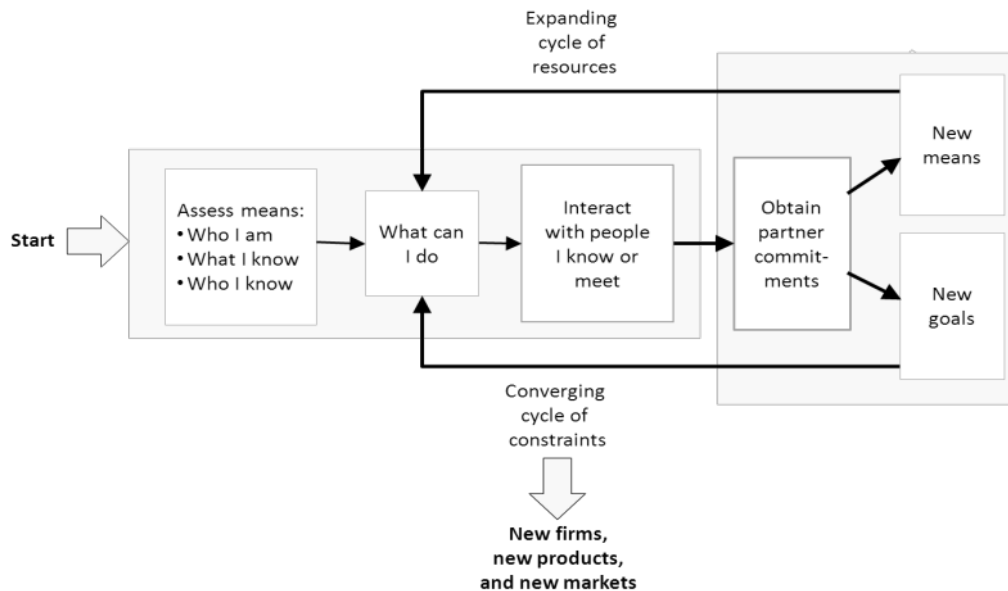


Figure 1. The main idea of the effectual process (Read et al., 2009; simplified),

An essential part of iterative processes is adaptive trial and error. It is necessitated by the uncertain, systemic nature of market creation. In this kind of a situation, predictive information does not support decision making in the best possible way; more reasonable is relying on strategies that enable direct control, co-creation, and transformation of situations towards positive outcomes. Quickly realised small successes and small failures help avoid the risk that some action would put the entire effort in jeopardy. Preparedness to considering alternative markets and changes in value propositions is a pattern that should be actively embraced, even if it necessitates product or strategy change. (Sarasvathy and Kotha, 2001)

Even though setting the goal and proceeding towards it in systematic steps is not an efficient way to tackle the unknown, an alternative approach must include enough structure to support the utilisation of resources and to foster collaborative creativity. This can be achieved via framing the problem in hand comprehensively: using a framework or schema within which specific decisions and their linkages to other decisions can be contextualised. The ability to group problems into fundamental categories and relate them to other problems results in knowledge architectures that link multiple decisions in the task domain over time, with feedback and interpretation – not isolated decisions. (Read et al., 2009)

The approach of effectuation has not been explicitly linked to the theories of innovation. However, this kind of linkage would be highly beneficial. We see connections between the effectuation model and the process model of practice creation by Lounsbury and Crumley (2007), the change model by Dorado (2005), the dialectical perspective to institutional change by Seo and Creed (2002), and the process model of legitimacy by Drori and Honig (2013).

We argue that the main principles of effectuation are applicable, not only in the market context, but also in the public sector where the need for innovation is as urgent as it is in private companies. Thus, we illustrate with our case study, how a public innovation process could be understood as an effectual process.

3 Empirical research

3.1 The case and the methods

Our paper includes a case study, with two phases, on the development of municipal services for children and young people in a middle-sized Finnish city where instead of the earlier, administrative division of these services into day care, schools, club activities etc., these services nowadays share an integrated framework for holistic wellbeing and form an integrated whole in suburbs. In addition to this renewal, the city has encouraged citizens' initiatives regarding the development of services, and empowered employees to engage in experimental development.

The first phase of our study dealt with the so-called ‘mini-pilots’ -project that the city (the department responsible for purchasing services for children and young people) launched to foster small innovative experiments among citizens, companies, third sector organisations and city employees. The goal was to increase the knowledge concerning 1) the service needs of citizens and 2) the willingness of various actors to participate in the cooperative development of services. The mini-pilots experiments were carried out as by the initiators themselves in collaboration; the city provided seed money. The project produced 120 ‘mini-pilots’.

The need for the project emerged after the purchaser of the services for children and young people had launched a new service strategy. This strategy focused on service provision that could 1) promote the holistic wellbeing of children, young people and the family, and 2) be produced in cooperation with citizens and different service providers instead of the sector-based allocation of responsibilities. In this situation, the traditional way to forecast service needs and to produce or procure services on that basis was insufficient and inadequate. The city organisation needed new insights and deeper understanding to build an integrated service system rather than separate services (Osborne et al., 2012), and to base this system on the user and stakeholder value. The situation showed typical features of uncertainty (Read et.al, 2009): the decision makers were ambiguous regarding the preferences and consequences. Thus, the mini-pilots reflected the organisation’s wider aim to transform services.

The second phase started when the provider organisation wanted to take a further step based on the results of the mini-pilots. At this stage, a more systematic mechanism was searched for: the aim was to provide – not only ‘nice additions’ to the service repertoire of the city – but to foster a more regular bottom-up input that could influence the ‘official service system’. The service provider had just launched an organisational transformation in order to promote holistic and cooperative services. This transformation included new wider collaboration at the suburbs level and a new management/leadership model. For this purpose, another more specifically defined pilot was planned together with researchers (the authors of this paper).

Here, the idea was to collect service initiatives from grassroots level and to combine them with strategic administrative aims in a multidirectional dialog. The focus was on school and day care services in two suburbs. *The effectual approach shown in Figure 1 was the explicit starting point.* The approach was tested in four workshops: the first one consisted of citizens and grassroots employees, the second one of school and day care managers, the third one of the administrative managers for children and youth services, and the fourth one of all these stakeholder groups. Due to the experiential nature of the pilot, the participants were invited – there was not an open call.

3.2 Results

3.2.1 Phase I: the mini-pilots

In order to be accepted as a mini-pilot, the applicants had to fulfil two requirements. First, there had to be at least two actors representing different actor groups. Second, the idea included had to be new, beneficial and replicable for children and young people. Regarding the contents, there were not specific restrictions because the aim was to encourage the emergence of a variety of mini-pilots. The actors were allowed to define the problem themselves and then implement the solution in the way they found most suitable. A project manager (agent) was hired to coordinate the project and a steering group was established to ensure its realization. The financial support for each mini-pilot was 500 euro.

The city compiled versatile documentary data about the mini-pilots. This data was in the form of case reports that covered 103 mini-pilots and included basic facts of them. We used this data as the starting point in our study. In addition, we observed some workshops held to support mini-pilots actors. In order to get deeper knowledge, we carried out 17 interviews between January and May 2012. Mini-pilots have been analysed applying the effectuation model and institutional theory.

Via the mini-pilots project, the city authority aimed to find new knowledge and other resources for solving the existing problems, and also succeeded in this aim. The results reveal that the composition of actors was very versatile: it included companies, public organizations (e.g. schools, libraries, retirement homes), non-profit organisations (e.g. child and youth organizations, sports clubs, pensioners’ associations), and individual citizens. *Mini-pilot actors can be described as ‘authorised with the given resources’.* This role is stronger than to the role of a consumer, user or a citizen as such. Professionals took part in the mini-pilots as facilitators, but they were seldom in an active role. Managers adopted more often the entrepreneurial way to act, and as they also possessed resources, they had a role of a gatekeeper.

Concerning the focus of the mini-pilots, the main finding was that the core service processes like curriculum/teaching in the classroom or actual care in the kindergarten remained untouched and outside of the mini-pilots. All in all, resources were mobilised and integrated to the core of services in four different ways: 1) to enrich the core activity of the service, 2) to support or supplement the core activity of the institutions, 3) to develop more radical boundary breaking activities, and 4) to strengthen the viability and cooperation within the broader community. Most mini-pilots were aimed to enrich and support or supplement the core of the services and communal resources. Two-three mini-pilots could be defined as radical boundary breaking activities, in which the actors were able to transform the core of service processes.

An illustrative, and also quite innovative, example of the mini-pilots was various activities aiming to increase dialog between the generations: make the seniors to interact with children and youth. Both generations benefited each other

with their own competences, and the younger generation became in a natural way familiar with the living in former times. Another innovative example deals with the activities carried out by an individual: a young unemployed man. He organised activities for his friends whom the employment officials had been unable to reach and engage. In this example, the roles of professionals and a lay person were exchanged, the professionals staying in the 'back office' and supporting the lay person.

Altogether the mini-pilots indicated more the need for different kind of activities to engage in than the service needs. The contents of the mini-pilots were more social and communal than professional. We were able to verify a finding by Battilana (2006): the lower position in organisation and community enabled to engage into experimental development like mini-pilots and to initiate radical changes into existent practices and to create new ones.

In Figure 2, we present the identified ways to integrate resources from the viewpoint of one actor (school). In the picture we have also illustrated what kind of institutional work – decision making, sense making, or collective mobilisation (cf. Thornton et al., 2012) is needed in order to enable activities like the mini-pilots.

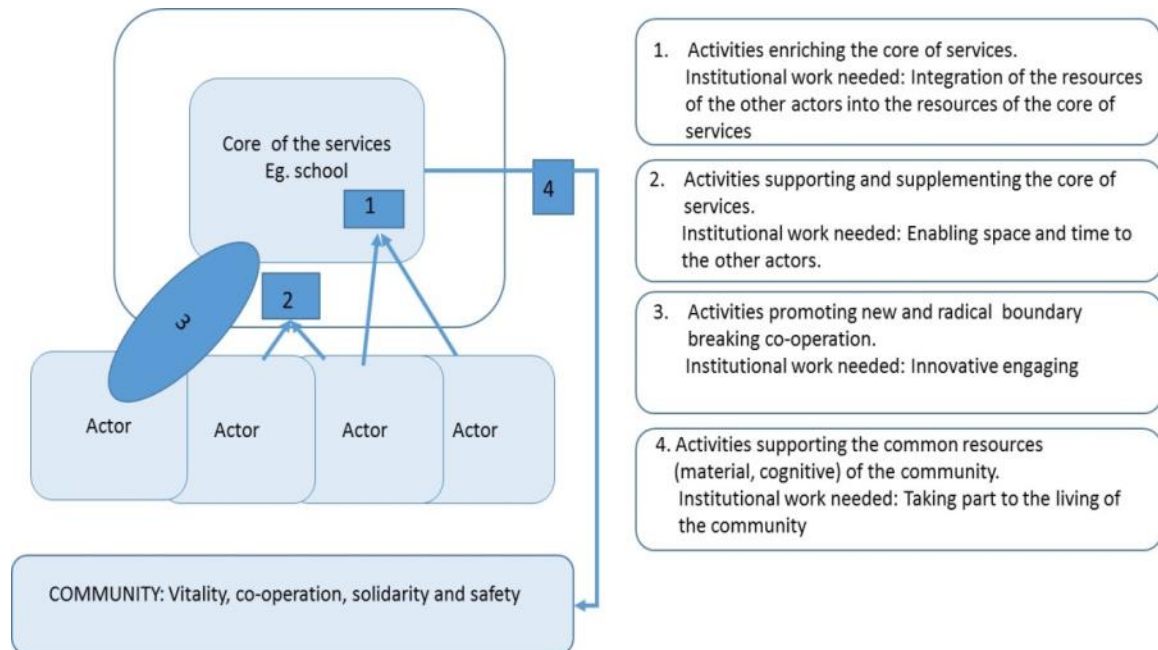


Figure 2. The focus of the resource integration based on the mini-pilots case.

3.2.2 Phase II: a further step with the effectuation process

The mini-pilots project showed several features of the effectual approach. Figure 3 summarises these features and concretises the problems, actors, means and goals with illustrative examples. In the evaluation discussions with the researchers, the representatives of the city authority expressed their willingness to take a next step: to experiment how the bottom-up collaboration with citizens could be encouraged by applying the effectual model more systematically.



Figure 3. Effectuation-based features of the mini-pilots.

As mentioned above, the mini-pilots created initiatives that were mainly outside the core of services. In the next stage, the idea was to broaden the experiments towards this core: the daily life of citizens and service organisations. This effort was used to support the organisation of services in a new way locally in suburbs. Support was needed because the new organisation requires innovativeness from the employees and emphasises collaboration both internally and externally.

Three workshops of different levels were organised in cooperation with the managers of the services for children and young people. The tasks for the workshops were set according to the effectuation model: who we are, what we have/know to go further, who we need to co-operate with, and what concrete deeds we are able to take up. The first level workshops took place in two different neighbourhoods. The second level workshops engaged middle management and the third level workshop strategic management. The researchers documented the discussions and circulated the summaries of the results from one level to the next. Finally, all the participants of the workshops gathered together in a common workshop.

From the research point of view, the final workshop was used to validate and supplement the data gathered in earlier workshops. The data has been structured according to three topics: 1) institutional conditions to enable innovations (logic of commitment, 2) agency (logic of identity and 3) focus of innovations initiated (logic of action). In the following we discuss these different topics one by one.

Conditions (logics of commitment)

The elements that seem to promote commitment of the stakeholders and citizens were the strategies of the city and the cohesiveness of the neighbourhood. A strategy which highlights cooperation was welcomed by the actors, and was experienced as a common resource. The slogan 'everyone is permitted to innovate' was seen to provide individual and collective wellbeing and relief in the work. On the other hand, the new managerial arrangements in the wider suburbs were not yet well understood, leading to some confusion about the activities that are desirable. At the same time, the strategic management group expected these kinds of initiatives to support the transformation. There was also difference in the commitment to the neighbourhood in the two suburbs. One of them was very autonomous and possessed a strong identity while the other neighbourhood was less coherent and expected external support.

Agency (the logic of identity)

Emerging actors within the further step – workshops were both citizens and professionals. Actors (citizens and grassroots employees) appeared as multiple level actors representing at the same time their personal experiences and knowledge's as parents, professionals, active citizens or politicians (cf. Sarasvathy and Dew, 2005; Osborne et al., 2012). The result resonates with the notion of the multidimensional nature of agency (cf. Smets and Jarzabkowski, 2013).

Possibilities to be an innovative actor was experienced (by the actors) to deal with easiness (not too much effort), freedom and voluntarism. Simple tools to promote cooperation were asked; how to get known the partners, how to build a network. We agree the notion that the cognitive and emotional efforts are necessary to gain reflexive awareness and engage innovation (Lawrence et al., 2013); Foss and Lorenzen, 2009). This means that arousing and maintaining the reflexive awareness and casting a glance at the future will be the critical question for managers in promoting bottom-up innovations in the context of traditional institution.

Focus (the logic of action)

In the workshops we could indicate four different levels of initiatives: 1) individually focused initiatives, 2) workplace and neighbourhood initiatives, 3) suburb level initiatives and 4) city level initiatives. The initiatives discussed in the workshops pursued mostly the first and second levels. On these levels, the actors seem to have a sense of possessing resources and autonomy to adhere the issues 'I just take a call and tell my idea'. Leadership of the own workplace was experienced as an important resource to encourage innovation, the slogan being 'leading from the centre with minimal regulations and pressures'. This resonates with the notion that small groups promote entrepreneurship (Dorado, 2013). In order to establish lower level initiatives as institutional practices, the institutional work of strategic and operational management is crucial. This means continuing interactions between micro-level, meso-level and macro-level (cf. Suddaby et al., 2013).

Issues from the third level (new suburb) were identified, but the alternatives and resources to handle with them didn't took the shape by actors. This may be explained by the novelty of the new arrangements in the suburb. Sense-making and sense-giving were asked from leaders and managers to make the new arrangements understandable. There were also some issues concerning on the broader cross-sector and city-level practices and policy (the fourth level). In these cases resources and coordination were asked from the high managerial level, 'from the city'.

4 Summary and concluding discussion

4.1 The ideal model to establish grassroots innovative activities

Our results revealed that innovative attitudes are quite general in such a public context that we examined: it was quite easy to encourage citizens and employees to be initiative. However, the activities emerged were small-scale trials. The small scale demonstrates that they were *performance-based activities* instead of institutionalised practices (a set of activities). They were local and pragmatic focusing on the tiny things/issues that improve the daily living of inhabitants and provide small varieties to the extant processes. Even though tiny varieties are essential to changes in the public sector (Aagaard, 2012), the impact would be much stronger if the grassroots initiatives could be *transformed into established institutional practices* that include employees, managers and citizens. Based on our results, we have built an ideal process model (Figure 4) that illustrates how such a transformation could take place and gain legitimacy by citizens.

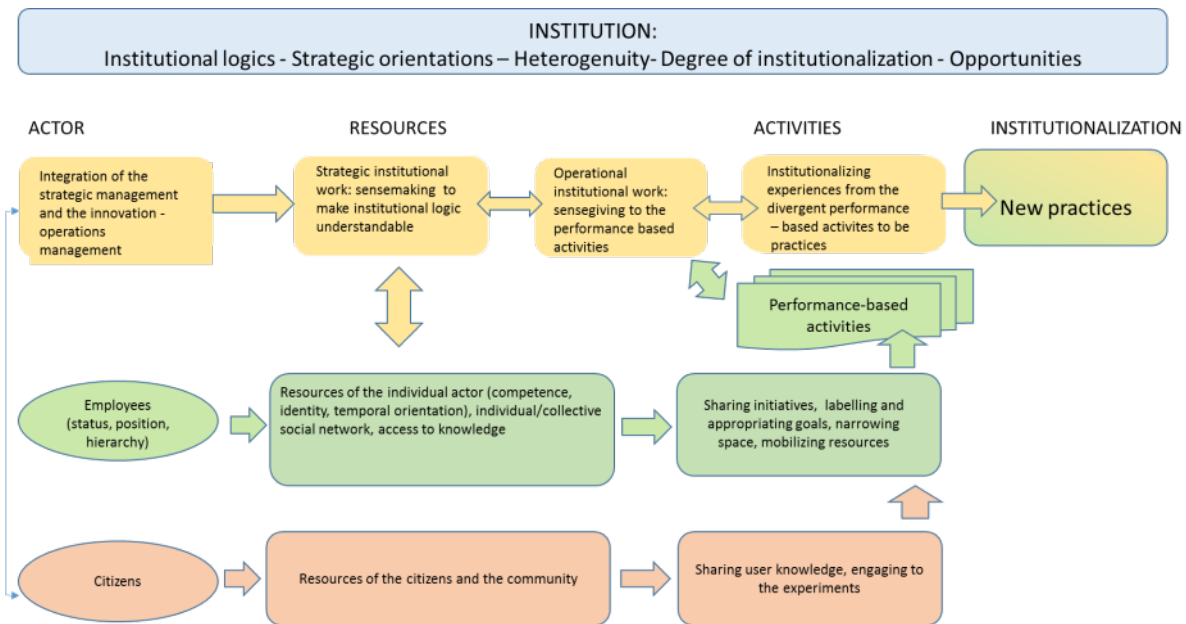


Figure 4. Institutionalisation of the performance - based activities.

We suggest that on the individual level as well as on the workplace and neighbourhood levels, actors experience themselves sufficiently autonomous and enabled to mobilise resources and engage in innovations. To become established as institutional practice, the various experimental activities from these levels should be put together and analysed by the strategic and operational management. These results are in line with the emphasis of earlier literature on the projective dimension that supports future change and entrepreneurial and creative behaviour (Battilana et al., 2009; Lawrence et al., 2009). Also the ideas of Thornton et al. (2012) are relevant here: the separation of decision making, sense making and collective mobilisation as the key elements of institutional work, which links the dynamics of practices and identities. To be successful entrepreneurial efforts has to gain legitimacy (Drori and Honig, 2013; Lounsbury and Glynn, 2001).

4.2 Concluding remarks and avenues for further studies

This paper has analysed innovation in public services from the effectual point of view. The activities that we examined in our empirical study were mainly external to the core services, aiming to support, enrich and supplement them. A question arises: what does this result tell about the characteristics of expected future services and what does it tell about the citizens' and employees' desire to become engaged?

The scale of activities describes the material and cognitive space where the actors have a sense of enabled entrepreneurs. The focus and scale may be understood in terms of a 'bandwagon process', in which participants negotiate the possible issue of cooperation. Fuglsand and Eide (2012, 419) highlight that on a bandwagon 'the different activities of different actors become structured around a common field of meaning'. Boundaries of the process may be mental, social or physical (Montgomery and Oliver, 2007). Boundary objects will be found by labelling (identifying the meaning of the interesting issue in question), by appropriating of the issue collectively to resonate with the community, and by narrowing the conceptual and technical space to make cooperation possible (Fujimura, 1992; Star, 1989; Corradi et al., 2010).

Lounsbury and Crumley, (2007, 997) ask 'how the performativity driven variations in activities can spur field wide efforts to establish a new innovations as a practice'. We have formulated an ideal model (Figure 4) to describe the

development of performance based activities from the individual and group levels to the level of established institutional practices. We assume that it is the task of innovation management to formulate the central questions when enhancing public innovations. In order to promote innovations that start as small scale activities, the institution has to find actors who 1) are able to recognise the tiny elements of innovations, 2) to feed these (possibly delicate) elements, and 3) to carry on their implementation systematically.

In the first experiment of our study, the role of an agent was central for the operational management of innovation – this role can be interpreted in terms of meta-governance (Sorensen and Torfing, 2011). The agent was able to use institutional tools like structure and design of the organisation; political and discursive framework; and process management and direct participation (Sorensen and Torfing, 2011). The steering group involved was responsible for the strategic management. In the second experiment, both the strategic and operational managers were engaged in the effort.

Our results confirm several views presented in earlier literature. They are in line with the view of Arend and Chen (2012) about the importance of strategic management in entrepreneurship and innovation, and with the view of Sorensen and Torfing, (2012) about the importance of leadership. The central role of middle managers for the continuation of social initiatives was clearly visible. It confirms the view of Sharma and Good (2013) about the role of this group in maintaining the hybridity of profit and social logics. Our results also highlight the significance of innovative culture in the fostering of a systematic way to develop services, and point out the integration of operational service delivery and strategic service orientation (Teboul, 2006). Osborne et al. (2012), who apply service-dominant logic in the public context, summarise most of these factors in their emphasis on the simultaneous implementation of strategic orientation, marketing, co-production and operations management.

To become established as institutional practices, innovative activities need to be interpreted against the institutional goals, logics and expectations. In our case, these activities focused mainly on the boundary levels and produced intangible outputs that were social, organisational and individual in nature (cf. Hill et al., 2011; Osborne et al. 2012). The actors reported increasing wellbeing, joy and communal trust as the outcomes of the activities. A question arises whether these results are in harmony with the expectations, goals and logics of the institution. What is the added value they provide to the knowledge base of the strategic and operational management? In our case, the city was satisfied with the results and has continued to carry out mini-pilots 1) as activities in some suburbs and 2) as a model building which targets at systematic, experience-based service development for the provider organisation.

One more question to be raised based on our results concerns the increasing complexity of the institutions and the inter-institutional orders following many organisational changes. The emerging complexity raises questions about how to handle it: how it changes the innovation context. Actors may experience the changing environment as hazy and inchoate. They may not be able to imagine alternatives and opportunities, to know the resources to be used, and to have access to knowledge. Therefore, actors need an adequate organisational structure and support from the managers whose work is to interpret the divergent logics of complex organisations. It is important that the perspective of institutional dynamics and complexity is taken into account and linked to the issues of actors in their concrete daily work. This is a task for both the managers who create the innovation enabling institutions, and for the researches who analyse these institutions (cf. Smets and Jarzabkowski, 2013).

Our study contributes to the effectuation model by highlighting two elements that are particularly relevant when this model is applied in the public context. Firstly, public innovations are collective activities of partially autonomous actors, which implies that effectuation has to be analysed as a collective activity, too. Secondly, effectuation reached in the individual or group level innovations becomes more general via institutional work. This means that also strategic and operational management processes should follow the effectual logic. Actually, in the public context the first question of effectuation ‘what we want to be’ should be supplemented with a question ‘what the institution wants to be’ (cf. Kodeih and Greenwood, 2014).

An important conclusion based on our paper is that the effectual approach provides an innovation process model whose main principles are applicable, not only in the market context, but also in the public sector. Even though the resource expansion in our case is still going, we have been able to make some initial observations that are crucial and whose validity in more general contexts could be tested in further studies. One such observation is the important role of improvisation, courage and tolerance towards failures as factors that favour the emergence of novelties. Another area for further research is the applicability of service-dominant logic (SDL) in the public sector. Our example illustrated the actions of citizens (users) as innovators and the role of public professionals (providers) as facilitators in the innovation process – a ‘work division’ that is in line with the foundational premises of SDL (Vargo and Lusch, 2004, 2008). Also the institutionalisation of the new practices is a topic in which our case has provided interesting material for the future research efforts.

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Manifestation of Innovative Behaviour in Health Care Renewal Activities

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Health care systems are under significant development pressure due to the ageing of population and the problems of public financing, which is why service and social innovations are sought out for. A new model of chronic care, and integrated care programs based on it, has been applied in several countries. Innovations in public sector originate from usually unconnected impulses from employees interacting with customers on the grassroots and from managers implementing policy requirements. Often these innovations have been analysed as top-down activities leaving the initiatives arising from bottom-up to smaller attention. This paper examines the innovation capacity of a health care organisation implementing a CCM-based renewal through the lens of innovative behaviour. The focus in this paper is on studying how innovative behaviour is manifested among different actor to better understand the innovation potential within a public organization and reveal how this potential should be better supported.

1 Introduction

The role of innovations has become increasingly important when tackling with complex societal problems, particularly in the health care sector. Due to the ageing of population, there is a growing demand for health services while the public resources to maintain and develop these services are diminishing (Dunston et al., 2009). Efficient in-house processes are no more sufficient; now the crucial issue is the empowerment of citizens and collaboration with them.

As an answer to the challenges, health care organizations have begun to renew the health care provision by adopting so-called integrated care programs that highlight patient support and education, combined with structured clinical follow-up and case management; a multidisciplinary patient care team; multidisciplinary clinical pathways and feedback, reminders, and education for professionals (Ouwens et al., 2005). These programs, carried out in various countries, are based on the *chronic care model (CCM)* developed to improve the management of chronic illnesses through six cornerstones: utilizing community resources, developing health organizations, investing in self-management support, redesigning service delivery, employing decision support for professionals and utilizing clinical information systems. Segmenting the chronic patients according to the intensity of care needs is a part of the model. A three-group division – so-called Kaiser Permanente Triangle – is typical and consists of patients with multiple diseases, patients with high risks, and patients with a self-manageable disease (Bodenheimer et al., 2002).

CCM, together with the integrated care programs based on it, differs from the previous models of acute care and the expert-led health systems that have dominated: they are patient-centred (not sickness-centred), their focus is on planned, proactive care (not only on the acute, reactive care) and they provide support to the patient (not only diagnostic information). The key is to empower patients by treating them as experts of their own health and as partners in healthcare, and this is eventually expected to ease economic constraints in the health care sector (Coulter, 1999).

An important insight in the circumstances of ageing population is that the quality of life can be high even when a person has a chronic disease. Health does not only mean the absence of disease, but it includes capability to cope and function with everyday physical, emotional and social challenges (Huber et al., 2011). Many studies have examined how health systems could be rebalanced from addressing the treatment of acute illness to engaging citizens in promoting their own health. Studies on health services have usually focused on hospitals and specialized care, but the new integrated care programs have stimulated interest in the systems of primary care (Dunston et al., 2009).

To support the renewals in the systems of primary health care, service and social innovations are sought for. New ways of interacting and participatory processes are necessary for the creation of innovations in a multi-agent environment (Harrison et al., 2010). Innovations in public sector originate from usually unconnected impulses from employees interacting with customers on the grassroots and from managers implementing policy requirements (Sorensen et al., 2013). Often these innovations have been analysed as top-down activities leaving the initiatives arising from bottom-up to smaller attention (Windrum, 2008). In service innovations, practice-based innovation is of central importance and is greatly dependent on the creativity of front-line employees (Sorensen et al., 2013). The practice-based innovation impulses become crucial, especially in the implementation of new integrated care programs.

In our paper, the interest is on understanding these two unconnected views during the renewal activities based on CCM. We examine the renewal and change activities of a health care organization from the perspective of innovative behaviour (Kleysen & Street, 2001). Innovative behaviour has been studied in the context of knowledge-intensive business services (KIBS) for instance (Tuominen & Toivonen, 2011), but corresponding research in public organizations is missing. The focus in this paper is on studying how innovative behaviour is manifested among different actor groups responsible for the implementation of integrated care programs based on CCM. We argue that studying the innovation and change activities in the health care renewal from the perspective of innovative behaviour enables us to

better understand the innovation potential within a public organization and reveal how this potential should be better supported.

We have set the following research questions for our study:

- What kind of new innovative solutions are developed in the adoption of CCM-based integrated care models?
- What types of innovative behaviours can be found among different actors in the renewal and development activities?

In our analysis we will utilize the concept of innovative behaviour and its elements to study the change and renewal activities of the case organization from the point of view of different organizational levels. We will also utilize a multi-agent framework to analyse service innovation (Gallouj & Weinstein, 1997; Windrum & Garcia-Goni, 2008) to better understand the innovative behaviour categories associated with individual innovation (Kleysen and Street, 2001) in the health care renewal context.

2 Theoretical background

2.1 Innovative behaviour

To understand the renewal activities within the health care sector, we will utilize the theories of innovative behaviour in our analysis. Innovative behaviour, a concept arising from social and organisational psychology, can be defined as all individual actions directed towards generation, introduction and application of beneficial novelty at any organisational level (West and Farr, 1989; Kleysen and Street, 2001).

Studies of innovative behaviour have typically focused on incremental and process-related innovations at the shop-floor level of an organisation. The concepts of innovative work behaviour (IWB) (Axtel et al., 2000; Janssen, 2000; Ramamoorthy et al., 2005; Dorenboschet al., 2005) and individual innovative behaviour (De Jong and Kemp, 2003; Kleysen and Street, 2001) are neighbouring concepts in this area. In these studies the focus has been blue-collar workers in industrial organisations, knowledge-intensive, non-managerial staff in a government organisation, or co-workers in knowledge-intensive service firms (De Jong and Kemp, 2003; Dorenboschet al., 2005). Kleysen and Street (2001) have applied the concept of innovative behaviour to all kinds of innovations at both the worker and manager levels in various organisations.

Innovative behaviour studies also concentrate on informal innovative actions in contrast to formal innovation processes. It has been suggested that although innovative behaviours might not be formally required, the activities are important for organisations' survival. The emphasis of innovative behaviour studies has hence been on identifying the factors that enable and motivate employees to undertake these behaviours (Scott and Bruce, 1994; Janssen, 2000; Dorenboschet al., 2005; Ramamoorthy et al., 2005).

Kleysen and Street (2001) have identified five elements of innovative behaviour including a variety of tasks: 1) opportunity exploration: paying attention to opportunity sources; looking for opportunities to innovate; recognising opportunities; and gathering information about them; 2) generativity: generating ideas and solutions to opportunities; generating representations and categories of opportunities; and generating associations and combinations of ideas and information; 3) formative investigations: giving form to and fleshing out ideas, solutions, and opinions and trying them out through investigation: formulating ideas and solutions, experimenting with ideas and solutions, and evaluating them; 4) championing: socio-political behaviours involved in processes of innovation: mobilising resources; persuading and influencing; pushing and negotiating; and challenging and risk-taking; 5) application: behaviours whose aim is to make innovations a regular part of business as usual; implementing, modifying and routinizing (Kleysen and Street, 2001). These behaviours can occur simultaneously and iteratively among group context and individual actors during an innovation process (Kanter, 1988; Janssen, 2000; Axtel et al., 2000). The group and organisational factors become increasingly important as the idea proceeds from initiation to implementation (Axtel et al., 2000). The innovative behaviour elements are summarized in Table 1

Table 1. Elements of innovative behaviour (Kleysen and Street, 2001).

Innovative behaviour element	Description	Related tasks
Opportunity recognition	Travelling extensively through innovation opportunities in order to learn or discover more about them	<ul style="list-style-type: none"> ▪ Paying attention to opportunity sources ▪ Looking for opportunities to innovate ▪ Recognizing opportunities ▪ Gathering information about opportunities
Generativity	Behaviours directed at generating beneficial change for the purpose of growing organisations, their people, products and services	<ul style="list-style-type: none"> ▪ Generating ideas and solutions to opportunities ▪ Generating representations and categories of opportunities ▪ Generating associations and combinations of ideas and information
Championing	Individuals who emerge to take creative ideas (which they may or may not have generated) and bring them to life	<ul style="list-style-type: none"> ▪ Mobilizing resources ▪ Persuading and influencing ▪ Pushing and negotiating ▪ Challenging and risk taking
Formative investigations	Giving form to and fleshing out ideas, solutions and opinions and trying them out through investigation	<ul style="list-style-type: none"> ▪ Formulating ideas and solutions ▪ Experimenting with ideas and solutions ▪ Evaluating ideas and solutions
Application	Working at making innovations a regular part of business as usual	<ul style="list-style-type: none"> ▪ Implementing ▪ Modifying ▪ Routinizing

Tuominen and Toivonen (2011) have studied innovative behaviour in the context of knowledge-intensive business services (KIBS). They have argued that while there has been much emphasis on the operationalization of the innovative behaviour concept in previous literature, there is a lack of empirical insight into how innovative behaviours are realised in different organisational contexts and levels. We continue accumulating this kind of evidence in another sector. Using the categorization by Kleysen and Street (2001), we analyse renewal activities within health care to contribute to the understanding of how innovation occurs in public sector service organizations. In order to do so, we will first identify the outputs of the renewal activities to help understand what types of innovative solutions are developed by utilizing a multi-agent analysis framework to service innovation.

2.2 A multi-agent framework to identify service innovation

To understand the types of innovative behaviour, we first elaborate the created novelties by using a model for studying innovations in services (Gallouj, 1994; Gallouj & Weinstein, 1997) and its specific application in health care (Windrum & García-Goñi, 2008). The Gallouj-Weinstein model describes services as a set of final characteristics (user benefits), technical characteristics (production system) and competence characteristics, and defines service innovation as any change in these characteristics.

Windrum and García-Goñi (2008) argue that due to the specific nature of health care sector, the final set of service characteristics strongly depends on the competence of health professionals (i.e. human capital), and on the interaction between health professionals' competences and end-users. Following the classification of service innovations made by Barras (1986, 1990), they make a division into user-facing competences and supportive back office competences. User-facing competences refer to the knowhow and skills and interrelated technologies essential in providing final medical services to patients. Back office competences are the skills and administrative activities (e.g. patient booking system) that support the user-facing activity (Windrum & García-Goñi, 2008).

In our analysis of the actor preference and competence perspective, we propose a change to the original Windrum & García-Goñi –model: instead of seeing the service provider as a one entity (divided into front and back offices), the provider is divided into three groups: professionals (doctors and nurses), middle managers (responsible for development and implementation) and top managers (strategic managers, representing policy makers). The customers of health services are considered as the user group. In addition to the service characteristics, the core in the model is a multi-agent interaction in developing services. One of the values of this dimension is that it puts particular emphasis on the public sector's role in the innovation process.

Typically innovation research has been focused on the private sector innovation without putting too much effort to understand the role of public sector in creation of innovations. However, according to Windrum (2013), both political organizations and non-governmental organizations play an important role in innovation generation and dissemination as well as all agents inside a health organization: frontline workers and the managers should be motivated and skilled enough to ensure a successful implementation of innovation (García Goñi et al., 2008). In our paper, we acknowledge

the important role of public organizations, however, the focus from the perspective of innovative behaviour is on health service providers and users.

3 Research context and methodology

In this paper we have utilised a case study based approach (see e.g. Yin 2008, Eisenhardt 1989). We focus on studying the profound change process and renewal activities of a municipal health care organization in a middle sized Finnish city. To tackle the challenges the health care sector is facing today, the organization is comprehensively renewing its entire operational model and services following the principles of integrated care programs. The renewal has been going on since 2010 and is linked to a broader national exercise for social welfare and health care. However, the city's health organization has been exceptionally active in its innovation activities and learning about the newest developments of the CCM model and integrated care programs and in testing them in practice.

The key change following the principals of CCM is the renewal of the operational model of the health care organization and setting the management of chronic illnesses as the main goal. More precisely, this includes creating new service-oriented positions in the health organisation: service managers, service superiors and service coordinators as opposed to leading doctors and nurses. A part of the renewal is also the extraction of patients with chronic illnesses and multiple diseases from patients requiring acute care, and managing the patient flows by creating two care "channels" for these sub-groups and plans for a more versatile segmentation in the future.

The organization also invests and develops in services supporting self-management of patients, for example group services that are arranged for educating patients about their illnesses and about the prevention of further problems. Empowerment of patients a key element of the new activities, and is done with target-oriented phone calls by nurses to see how the care is proceeding. The focus is on taking a coaching approach to support patients in achieving goals. To support this, a responsible professional/professional group with whom the patient interacts directly regarding the issues concerning the treatment is assigned. Multi-disciplinary team work is an important part of the new model, which is expected to diminish professional hierarchy. The teams also collaborate with patients to support the holistic care - not focusing on one disease at a time. A systematic health plan, which is created in close collaboration between the professional and the patient according to goals set by the patient is essential in achieving long term health impact.

All these renewals in health care require new skills from the personnel, and the arrangement of workshops for the professionals about the re-organizing of care and new operation models around specific topics is a way of education, and also a means of encouraging dialogue between professionals of different areas. The utilization of new interaction technologies, the eHealth -system, is implemented to ease the communication between patients and professionals. Through the new system, patients are allowed to see their test results, treatments and health plans, and to transfer the measurements that they make themselves (e.g. blood pressure). Another important feature of the renewal is strengthening the collaboration with patient organizations, which can provide information, advocacy, peer support, training, rehabilitation and social events for patients.

Our extensive data on the case has been gathered during the years 2013 and 2014 and consists of primary data based on non-participant observations, action research, interviews, research diaries and documentation. It is supported by secondary data including documentation of the renewal process, reports, and learning diaries of some personnel representatives. To gain an extensive understanding of the renewal activities, observation, action-research and interviews have been utilized. The weekly meetings of two management teams responsible for the change process of the case organization were observed during February and June 2013. During the first three months, our research group observed without any participation to get an overall conception of the on-going transformation process. For the last two months, we then adopted an action research strategy: participating in the teams' conversations and pointing out problems related to the systemic change and solutions development. A detailed memo was created after every meeting.

The material gathered from the observations and participations has been further supported by individual face-to-face interviews (15 in total) with all the team members. These interviews were conducted in June and July 2013. The observations and action research continued until December 2013, and during year 2014 the gathering of the case material has continued in monthly workshops with the management team. We have seen this necessary in order to gain insight on how the innovative solutions and behaviour has developed throughout the process.

Our analysis will focus on four different actor groups; top managers, middle managers, professionals (doctors and nurses) and users. Since our data has been gathered in the management meetings, the information about professionals and users is indirect and based on the views of the members of the management teams.

4 Results

4.1 Identification of service innovations in health care renewal

The key change in service characteristics followed by the adoption of CCM in the case organization is the transition of the service relationship based on treating diseases and passive patient and nurturing doctor towards creating a service relationship based on empowering patients to manage their own health in collaboration with health professionals. This change influences the dynamics of power distribution between service provider and users greatly.

In the previous expert and sickness centred health service model the top management was relying in hierarchical processes in the operations. Imitating industrial models in patient processes to maximize cost-efficiency were dominant operational approaches. The new solutions based on CCM have changed the hierarchical structures towards encouraging and enabling collaboration between different organizational levels and different professional groups within the health care organization. This is visible for example in the renewal of profession titles from leading nurses and doctors to service managers. Emphasising service-thinking to strengthen the customer processes are the focus of development. From the perspective of middle managers, the old operational model resulted in seeing patients only as targets of care, and work days were filled with “putting down fires” and managing urgent issues in daily practises. Now patients are no longer seen as passive recipients of care but as active partners and resources in the care process.

Planning and coordinating services and customer processes enable moving away from only managing the “tyranny of urgent”. From the perspective of professionals the emphasis has long been on diagnosis-centred working and basing the competences strongly on medical knowledge, now the goal is to take a coaching and preventive approach to the care and increase know-how on service processes and user encounters. From the user perspective, the contact to the health experts usually happens when an acute health problem occurs. There has been great passivity regarding own health issues and patient have relied strongly on the care given by medical professionals. Now the emphasis is on planned collaboration with health activities complemented with own target oriented activities and taking an active role in promoting health. These above described actor preferences and competence changes are summarized in Table 2.

Table 2. A characteristics-based analysis of service innovation in the case: changes in actor preferences and competences.

<i>Actor group</i>	<i>Changes in preferences</i>				<i>Changes in competences</i>			
Top managers	TP ₁	Emphasis on hierarchy	TP ₁	Encouraging collaboration between different levels and different professional groups	TC ₁	Imitation of industrial models in patient processes, emphasis on cost-efficiency	TC ₁	Emphasis on service-thinking and strengthening customer processes
Middle managers	MP ₂	Seeing patients as targets of care	MP ₂	Seeing patients as partners and resources	MC ₂	Focus on managing the “tyranny of urgent” in the daily practises	MC ₂	Focus on planning and coordinating service and customer processes
Professionals	PP ₃	Emphasis on diagnosis-centred working	PP ₃	Emphasis on a coaching and preventive approach to care	PC ₃	Medical knowledge	PC ₃	Knowhow on service processes and user encounter
Users	UP ₄	Contact with a health expert when experiencing an acute problem	UP ₄	Planned collaboration with health experts combined with own activities	UC ₄	Passivity regarding own health; relying too much on professionals in the care	UC ₄	Taking active role and responsibility in promoting own health; target-oriented behaviour

4.2 Manifestations of innovative behaviour types

In our analysis we utilized the typology of Kleysen and Street (2001) and examined how these types of innovative behaviours occur in different actor groups during the renewal activities of the health care organization. All five types of the behaviour types could be identified, and similarly to the study by Tuominen and Toivonen (2011), we noticed that the behaviour types occurred iteratively and many overlapped each other. We will next present more precisely how each behaviour type occurred in the previously defined actor groups.

1) Opportunity recognition: In our case, the growing pressure to show productivity of health care centres, starting the national health sector renewal and internal management problems acted as key drivers for identifying new innovation opportunities by the top management. These activities were performed generally and related to specific problems in the health care sector. The role of top management was very central in searching for new solutions; the managing director, for example, travelled across the country and abroad to discover and learn how health care services are organized elsewhere. Also other members of the top management visited fairs and conferences abroad and brought back their insights and suggestions for further development.

The top management created a small R&D department working on the side of managers responsible for gathering knowledge on future trends and benchmarking other health organisation to support the managers' development work. Knowledge gathering activities, therefore, were of central importance in identifying new opportunities. The middle management also engaged in knowledge sharing activities, though these activities were strongly connected to the daily practises in the health operations. Many opportunities were identified through challenges in the daily activities and brought to the middle management's attention. Opportunity identification, therefore, occurred in learning from challenges in daily work practises and service events.

The professional's role was to recognize the challenges and reporting back to the middle management. This became crucial especially in the implementation of new working practises. User acted as resources for opportunity identification; feedback was gathered from the customers, however, not very systematically. Our case representatives reported about the problems in getting the personnel involved in the development work and seeking new opportunities, which was mostly due to the fact that developmental tasks were expected to be performed alongside regular care work. The new "licence to innovate" –culture was also new in the organization, and many employees focused on issues close to their own work without any link to the future developments.

2) Generativity: From the perspective of top management these activities concern very much the creation of new service solutions to challenges the health organization is facing. The new solutions have been developed based on various opportunities and examples identified in the beginning of the renewal process. The middle managers role in developing solutions has been bringing ideas regarding the daily practises to the management meetings for discussion and development. A central task has been creating work groups responsible for developing and implementing the ideas further. This was done in various occasions in multi-disciplinary groups, meaning that cross-professional collaboration was encouraged.

All the members of the management teams were able to contribute to the idea generation through e-mails, which were sent to team members for further improvement and idea generation. The professionals were able to participate in generating ideas and solutions through workshops created to increase the dialogue between managers and employees. This was a major improvement in the innovation culture, since before these events were merely lectures. However, challenges arose due to the lack of proper motivational activities regarding the workshops; in the beginning of the renewal process there were very few participants and follow-up after discussions were missing. Users had little role regarding the generativity activities, as they were not included in developmental tasks in the definition of new solutions.

3) Championing: The top managers had a key role in this activity, especially for the reason that innovation activities were new to the organisation and that kind of behaviour had not been expected before from the personnel. Championing plays a key role in an organization culture where innovation activities are new. Personal relationships, challenges of multi-disciplinary team work and new work practises created a lot of scepticism among the actor groups. The managing director of the health organisation had a management style of empowering all management team members to take responsibility and part in discussions. This was done many times by challenging the ideas and comments with a very strong, even conflict-seeking attitude in order to spark up ideas and conversations. Many reported the difficulty of having multiple strong-willed persons in the teams and pushing was considered to be a threat sometimes.

Challenging as a way of championing, however, was seen as a necessary mean for enhancing change especially when dealing with municipal decision makers. Responsibilities were divided equally among team members to enhance the development work. The top management team also had a mentoring program, where they acted as mentors to new service managers representing the middle management. The middle management had the important role of motivating the professionals to take new forms of activities into use and supporting them. Repetition and active support for the implementation activities was reported as most essential to keep the personnel motivated. The middle management's role was also to act as a bridge between the professionals and top management in selling ideas both ways, a role, which was considered to be very challenging.

There was great tension between the top management and personnel; the personnel felt that the managers do not understand the everyday work and they could not understand why the personnel was not feeling motivated enough to implement new solutions. The professionals performed championing activities by marketing new services to customers,

and were in key role in persuading and influencing them to utilize new service forms. They also created team spirit internally in multi-disciplinary teams, for example, after a successful piloting campaign of new e-Health service accounts, a nurse had made a cake with the phrase "Go us!" to congratulate the team. Users acted as targets of the championing activities of professionals in marketing new services.

4) Formative investigations: In our case organization this behaviour occurred through the evaluation of success of implemented services and concretizing the content of developed solutions by assigning employees responsible for it. The top managers conducted these activities by evaluating ideas brought to the table in management team meetings, sometimes with a very confrontational manner. Discussions in team meetings were very important in creating mutual understanding of how the services should be executed and implemented and decisions were made in the group. Describing the service and customer processes in detail was of great importance, and people in charge of the processes were also determined to ensure that ideas move forward. The middle managers' role was discussing ideas in team meetings and also concretizing their content, and a key part of this was to bring the thoughts of the professionals to the table. The middle managers were in charge of arranging workshops for the personnel to get them more involved in developing new services.

Evaluation of experimentations also occurred, and one middle manager for example gained insight on how the new work activities should be utilized in all services the health organization is providing. A great realization was also the need for auditing the experimentation of new services. The professionals' role in conducting formative investigation activities occurred through experimentation of new services in piloting campaigns, for example in e-Health account campaign and piloting the group services. In the group service pilot challenges arose due to the fact that the personnel felt that decisions are made top-down and the solutions are expected to be implemented by the personnel without empowering them in the process. Feedback was gathered from the group activities and it occurred that many of the groups are empty due to the lack of a marketing plan. A solution was created to this by the creation of a team responsible for the group service development (co-development). Users in these activities were the targets of experimentation and providers of feedback. They evaluated the group services, and the result was that out of 12 responses only one customer was satisfied with the service, other 11 were not.

5) Application activities: Tuominen and Toivonen (2011), however, suggested that modifying is not a sub-category of application but consists of iterative application, evaluation and idea generation throughout an innovation process. Similarly in our case study, these activities occurred during various phases in the renewal process. New work activities, for example, were constantly implemented and routinized, and the top managers acted as examples for the rest of the organization. It was important to get the commitment from the managers in order to change the working culture.

Middle managers, on the other hand, supported the implementation of new work practises and service solutions in the daily practises through creating new routines and modifying activities if necessary. Learning and educating the personnel was important, and the management arranged various workshops and created instructions to support the implementation. The professionals conducted application activities through implementing new solutions and users acted as targets and adapters of new work practises and routines.

5 Discussion and Concluding Remarks

In this paper we have examined the manifestation of innovative behaviour in health care renewal activities. The focus has been on primary health care organization adopting the principles of CCM in its operations. CCM and integrated care programs based on it have been adopted in several countries as an answer to the challenge of ageing population and the problems of public financing. Central elements in the renewals are the empowerment of patients, increasing cross-disciplinary collaboration among professionals and effective use of the new information technology systems. Traditionally, studies on health services have focused on hospitals and specialized care, but the new integrated care programs have stimulated interest in the systems of primary care (Dunston et al., 2009). There has also been active research focusing on the micro-level interactions in healthcare: service encounters and prerequisites for success in them.

In the public sector, innovations originate from two different directions; from the frontline employees who interact daily with the customers and from managers who are responsible for implementing policy requirements (Sørensen et al., 2013). The research focus has long been on top-down innovation activities, which is why there is a need to understand how the top-down and bottom-up innovation activities could be better integrated. In this paper we have argued that this is extremely crucial in the adoption of CCM-based solutions in health care, where the frontline personnel play a critical role in implementing new solutions. The innovation capacity of an organization can be studied through the lens of innovative behaviour. Innovative behaviour has previously been studied in the context of knowledge-intensive business services (KIBS) (Tuominen & Toivonen, 2011), but similar studies in the public sector are missing. Studying the innovation and change activities in the health care renewal activities enables us to examine the innovation potential within a public organization and to understand how this potential should be better supported.

We have carried out an empirical case study in Finland and examined the renewal and change activities of a primary health care organization from the perspective of innovative behaviour (Kleysen & Street, 2001). In our analysis we utilized the concept of innovative behaviour and its elements to study the change and renewal activities of our case organization from the point of view of different organizational levels. First we identified the new innovative solutions developed during the renewal process by utilizing a multi-agent framework to analyse service innovation (Gallouj & Weinstein, 1997; Windrum & Garcia-Goni, 2008). The key change in service characteristics was the transition of the

service relationship based on treating diseases and passive patient and nurturing doctor towards creating a service relationship based on empowering patients to manage their own health in collaboration with health professionals. From the perspective of different actor groups (top management, middle management, professionals and users), this means changes in power distribution between health professionals and users and stronger multi-disciplinary collaboration and customer-orientation in service processes.

Examining the five innovative behaviour types in the health care organization has revealed how different actors engage themselves in change and renewal activities in a CCM-based health care renewal. All five types could be identified from our case, however, the roles in the activities varied. The top managers acted as discoverers, developers and creators of new solutions, as well as champions and mentors to the middle management. Middle managers had the important and challenging role of acting as “bridge-makers” between top management and personnel as well as developers, champions and modifiers. The personnel acted mainly as adopters and implementers of new solutions, but had also the very crucial role of acting as champions to the customers in marketing new services. The results indicated that there is hidden potential for service encounter-based innovation within the renewal activities. Users in our case were in a more passive role regarding the renewal activities, and acted as sources and targets of development.

Studying the different actors in health care renewal activities revealed that innovative behaviour occurs in various organizational levels. From our results we can identify the nature of innovation occurring within renewal activities. The behaviours of different actors showed that innovation occurred mostly initiated by the top management, as directed innovation developed based on strategic concerns to external pressures (see Fuglsang & Sørensen, 2011; Sørensen et al., 2013). The developed solutions were mainly done in the management teams, after which they were brought to the professionals for implementation. Though the professionals and users engaged in the innovative behaviour activities to some extent, their main role was to act as implementers and adopters to the new solutions. Looking at the renewal activities from their perspective, the link back to the top management was quite weak, though the potential for service encounter-based innovation is evident. Like many other organizations, our case organization has not yet utilized this potential (see Sørensen et al., 2013), due to the lack of support structures and suitable mechanisms. We argue that the nature of public organizations creates extra challenges in the utilization of front-line personnel and users in innovation, as in health organizations this type of innovation activities are new and the development tasks are expected to be conducted on the side of daily work.

Sundbo (2006) has suggested that innovative service organisations consist of a dual structure; an informal social system that produces ideas and a management system that supports the personnel and selects the ideas to be developed. Following this, Sørensen et al. (2013) propose organizational conditions that are required for practise- and service-encounter –based innovation; the organisational support system and a front-line innovation climate, which require new capabilities. The support system has the important role of facilitating and encouraging creativity in the front-line personnel as well as integrating and selecting presented ideas in the development processes. The support system is defined by the organizational confidence and management’s trust in the employees’ capabilities; the correspondence capabilities, for example communication channels and the management’s ability to choosing among innovation inputs and ideas. The front-line innovation climate, on the other hand, greatly depends on entrepreneurial working values, social intelligent to understand, observe and take seriously the user’s needs and recognition incentives that motivate the personnel to contribute to the development activities. Tools for managing these kind of innovation activities need to be developed (Alam, 2006; Sørensen et al., 2013).

Considering this, we argue that CCM-based renewals cannot be successfully adopted without involving the personnel and users in the process. In the adoption of CCM-based solutions in health care, the modification and constant iteration is necessary – activities, which are highly dependent on the role of front-line employees. They have the important task of perceiving how the developed solutions actually work in practise and reporting back end-user perspectives for the further modification and development of services. Practise-based innovation processes based on the employees daily practises that result in small and unintentional changes in services based on user’s needs are important (Fuglsang & Sørensen, 2011) but have been ignored in service organizations for too long.

Our results highlight the importance of empowerment to encourage innovative behaviour, as all employees are expected to act as intrapreneurs in the organization. The top managers’ role becomes crucial in stimulating and controlling these entrepreneurial activities (Sundbo, 1996). Based on previous studies, it is necessary to focus on creating a suitable organisational support system that enhances and enables a culture of innovation. The organizational culture also needs to develop following direction of the paradigm change in public services, where the professionals and patients are no longer seen only as providers and users of services but resources for innovation in health care.

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Health and healthcare services disparities in the Euro-Mediterranean Area

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The objective of this article is to analyse the development of health services in the Mediterranean countries taking into account their contribution to the regional cohesion and economic integration. We reviewed the literature on health and economic development and explore the support to the health objectives in the context of Union for Mediterranean (UfM) agreement. We also studied the differences between two groups of countries, EU-28 and MENA (Middle East and North Africa), in relation to their social, economic and health profiles. Finally, we offer some economic and health policy orientations linked to the development of regional healthcare systems.

1 Introduction

Health is at the same time a component and a condition for economic development. Thus, the improvement of health is a central aspect in the Millennium Development Goals (MDGs). For this reason, this work analyses the development of services in the Mediterranean countries as an integrative factor in achieving the MGDs. The achievement of high quality healthcare services with more equal accessibility is a guarantee for progress and social cohesion. Therefore, cooperation in general and specifically cooperation in health care are considered urgent and unavoidable necessities in order to address the great inequalities that still exist in the modes of living, contracting illnesses and dying. In addition, the global improvement of living conditions and the lack of access to quality health services in many countries can mean the difference between life and death.

Our objective is to carry out a first approach to the study of health status and healthcare services in the Mediterranean area. The analysis of the evolution of the main social, economic and health indicators reveals a weak convergence process that makes it difficult to achieve greater social and territorial cohesion in the area.

The document offers, firstly, a review of the main relationships between health and economic growth. Secondly, we examine the intervention strategies in the area of health by the European Union. Then we carry out an analysis of the situation in the different countries of the studied regions (EU-28 and MENA²⁰⁴ countries). From the empirical point of view we analysed the relationships among health expenditure, health resources, their utilisation, the per capita GDP, and the health status of each country. Finally, we will present our conclusions and some guidelines for intervention in health policy from the perspective of integration and cohesion, both social and territorial, in the Mediterranean Area.

2 Healthcare services and economic development

Health and economic development are closely related. The World Health Organisation (WHO²⁰⁵, 1999) stated that health has huge economic value and that improvements in health have similar economic consequences to economic growth. They make it possible to escape from the poverty trap. There is a wide range of literature that relates health status in a territory with economic behaviour, conceived as economic growth or development.

Mankiw, Romer and Weil (1992) were the pioneers in extending the Solow economic model of growth incorporating human capital in it— a concept in which they included not only education but also health and nutrition. Other authors such as Fogel (1994), Barro and Sala (1995) continued studying the connection between health and economic growth, and at the end of the nineties and the beginning of the new millennium there was a quick development of these kind of studies (López-Casasnovas, Rivera and Currais, 2005).

Good health is a central component of welfare, but most of these studies justify the improvement of health as something positive in purely economic terms. The link between health and economic growth is made through the concept of human capital, which makes improvements possible in both individual productivity and growth rates of a country. Smith (1999) tried to explain the causality direction between health and economic growth through life-cycle models that relate health conditions with future income, consumption and welfare. Bloom and Canning (2000) reinforced this causality with an education factor. The higher the education levels are the greater the achievements of productivity and income levels are as well.

From a wider perspective of economic and social development, the WHO established in the Declaration of Alma-Ata (1978) the goal of attaining a health status that allows a social and economically productive life to all the people, considering it a fundamental human right (WHO, 1978). This relocation of health as a human right is directly linked to

²⁰⁴ Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Syria, Tunisia, and Turkey.

²⁰⁵ WHO was set up on June 22, 1946 with the express purpose of achieving the highest possible level of health for all peoples, understanding that does not refer solely to the absence of disease or infection but to a state of full physical, mental and social wellbeing.

the human development approach promoted by the United Nations Program for Development (UNDP). The concept of human development promotes an expansion of human freedoms and the overcoming of the privations that limit the development of people. So, it is a priority to prevent the negative effects that situations of weakness of health services and other social and environmental determinants have on health.

Sen (1981) stated that health is one of the five instrumental freedoms needed for human development. In this context is where the importance of health for increasing the individual and collective capacities, defended by the theory of human development, begins to appear. Nussbaum (2002) specified a number of basic skills within the individual dimension of welfare pertaining to the human development approach, among which can be distinguished the possibility of being in good health. But individual welfare cannot be understood without framing it within the broader social dimension of the wellness process. This is where the need arises to take into account the collective capabilities that inform UNDP policies.

Human security is one of the axes considered within collective capabilities. This element has to do with predictability of human welfare, and it is especially vulnerable in a context of globalisation and economic and social crisis. Human security is embodied in the idea of freedom from fear, freedom from want and the avoidance of indignities (life of dignity).

The Human Development Report (UNDP, 1994) specified seven kinds of categories or threats to human security, including health security. So health is central to human security and development of human collective capabilities.

The importance of health in individual and collective capabilities justifies a broad analysis in which the state, the social agents, citizens, and the socio-institutional environment should be included. This analysis emphasises collective action and the obligation to have tools that facilitate the achievement of wellbeing in society (Wood, 2009).

In other words, the link between health and human development focuses the objective in expanding opportunities and capabilities of individuals and societies by guaranteeing both the universality of the right to health and the integrity of the health system and health services. This approach to health is holistic and multi-dimensional. It is based on the concept of patient-centred care and requires the state to guarantee universal access to health.

Compliance with these principles must be accompanied by inclusive public policies to improve access to health and the provision of related services in order to reduce social inequalities. Another axis of comprehensive intervention strategies is to promote social participation in health management and related services. The multidimensional perspective of health provided by human development requires taking into account some crucial policy elements, such as social and economic regulations with both national and international scope (The Lancet, 2014).

3 Health under the EU social cohesion framework

Social cohesion is one of the basic principles in the EU. Social protection systems are designed to offer risk protection in different spheres including health. Europe 2020²⁰⁶ Strategy and the Open Method of Coordination (OMC) for social protection and inclusion are the two main elements of the European framework to promote equity and social cohesion by means of sustainable and accessible protection systems as well as inclusive social policies.

The central axis of intervention is solidarity in health, i.e., reduction of inequalities in health within the EU. These inequalities undermine the efficiency and effectiveness of the European social model and erode social values²⁰⁷. And a wide range of causes is associated with these inequalities.

The current economic crisis affects negatively the provision of health services because of budget cuts that endanger the delicate balance in national health systems and increase health inequalities. This situation of greater vulnerability and increasing health inequalities within the EU can have irreversible consequences on social cohesion and productivity that can have negative long-term consequences on the economies of the member countries. Tackling health inequalities contributes, therefore, to the Community objectives of promoting economic growth and social cohesion.

The Commission for Social Protection (CSP) proposes several criteria for action to advance health equity, highlighting the incorporation of equality in health in the broader goals of social and economic development, the contribution of EU policies to reducing health inequalities, and the coverage of the needs of the most vulnerable sectors and groups²⁰⁸. In particular, it prioritises the need to ensure universal access to affordable and high quality health care, including prevention and health promotion, especially in the early stages of life. It also highlights the importance of ensuring coverage for all socioeconomic strata, particularly in rural and disadvantaged areas. In addition, a comprehensive approach to social determinants of health policy focused on both structural factors –life conditions or income policies– and discrete factors –exposure to risky lifestyles and risk factors– is emphasised.

Thus, policy coordination appears to be a crucial element for equal access to health and medical services. The Commission has identified a number of priorities: improving knowledge and information; establishing commitments

²⁰⁶ European Commission Proposal “Europe 2020 – A strategy for smart, sustainable and inclusive growth”.

²⁰⁷ Communication “Solidarity in health: Reducing health inequalities in the EU”, COM (2009) 567, <http://ec.europa.eu/social/main.jsp?catId=89&langId=en&newsId=619&furtherNews=yes> and http://ec.europa.eu/health/social_determinants/policy/commission_communication/index_en.htm.

²⁰⁸ Commission for Social Protection (2010/05/04) : “Solidarity in Health: Reducing health inequalities in the EU” <http://ec.europa.eu/social/BlobServlet?docId=5363&langId=en>

and agreements for cross-border cooperation; developing the contribution of different EU policies; and ensuring proper coordination between the national and the EU action plans to reinforce these priorities²⁰⁹.

4 EU cooperation policy in the Mediterranean

The Union for the Mediterranean promotes economic integration and democratic reforms in the 16 neighbouring countries to the south of the EU in North Africa and the Middle East. Cooperation agreements formerly known as the Barcelona Process were re-released in 2008 as the Union for the Mediterranean (UfM).

The re-launch was an opportunity to establish more concrete and visible relationships with the initiation of new regional and sub-regional projects with actual relevance to the inhabitants of the region. The projects focus on areas such as economy, environment, energy, health, migration and culture.

Along with the 28 member states of the EU, 16 Mediterranean countries in Africa and the Middle East are members of the UfM²¹⁰. Since 2011, the UfM strategy has been included within the structure of the Foreign Service of the European Union. Under the Treaty of Lisbon, this service channels all the foreign and security policy of the EU. With the EU support, a greater number of chronic diseases are treated in public hospitals and obstetric services in public hospitals have been improved. As a result, a greater number of births are attended to by trained medical personnel (MDG 4).

The Regional Strategy Paper 2007–2013 (RSP) provides the strategic framework for the programming of resources allocated by the EU for the Mediterranean region through the European Neighbourhood and Partnership Instrument (ENPI). This instrument provides coverage to the Mediterranean and Middle East, i.e., the members of the Euro-Mediterranean Society established in the Barcelona Declaration (1995). The Regional Strategy Paper and Regional Indicative Programme have been prepared in accordance with Council Regulation 1638/2006, which replaces the Financial Instrument for the region within the previous EU program for cooperation with Mediterranean countries (MEDA).

However, according to figures from the 2013 Annual Report on cooperation policies of the EU, the volume of resources really used in the Mediterranean region is well below that originally committed. In addition, health developments have a minimum financial impact.

Table 1. External aid financed by the general budget of the EU. Bilateral and multilateral flows (European Support only). Source: European Commission (2013). Annual Report 2013.

EUR Million	2008	2009	2010	2011	2012
Commitments	1,773	1,637	1,807	2,015	2,353
Payments	1,530	1,474	1,513	1,426	1,398

Table 2. European aid 2012: Sector Breakdown by region. Source: European Commission (2013). Annual Report 2013.

Sector of Destination	ENPI East	ENPI South	Asia	Latin-America	ACP	Multi-region	Total
SOCIAL INFRASTRUCTURE AND SERVICES	450	883	572	141	1,397	551	3,995
Education	93	215	262	58	154		781
Education (without specific level)	6	18	139		132		296
Education (Basic level)	2	50	72	32			156
Education (Secondary level)	11	82				5	99
Education (Tertiary level)	73	64	51	26	17		231
Health	6	22	163		188	79	457
Health (general)		2			44	19	65
Health (Basic)	6	20	163		143	60	392
Population policies/programs and reproductive health		2			207	19	228
Water supply and sanitation		21		22	482		525
Government and civil society	347	380	117	28	296	427	1,595
Other Social Infrastructure and services	5	243	31	34	71	26	409

²⁰⁹ <http://www.join-med.eu/> ; <http://www.med-dialogue.eu/>

²¹⁰ Albania, Argelia, Bosnia y Herzegovina, Croacia, Egipto, Israel, Jordania, Líbano, Mauritania, Mónaco, Montenegro, Marruecos, Palestina, Siria, Túnez y Turquía. Albania, Algeria, Bosnia and Herzegovina, Croatia, Egypt, Israel, Jordan, Lebanon, Mauritania, Monaco, Montenegro, Morocco, Palestine, Syria, Tunisia and Turkey.

5 Social, economic and health profiles

This section will address the quantitative study to analyse the trends in two groups of countries, EU-28 and MENA, in terms of chronological evolution and convergence –intra and intergroup. With this aim, the social and health context of the area is depicted and a descriptive analysis from the WHO databases, UNDP indicators, and the demographic data from the United Nations, World Bank, etc., is also offered as well as a cluster analysis. The analysis and variables have been divided into four areas (5.1 to 5.4).

5.1 Demographic and socioeconomic factors

There are numerous demographic and socioeconomic factors influencing the health status of the population in a given area. Here we have selected the most widely used in this type of studies, taking into account the limited availability of data²¹¹.

5.1.1 Raw birth and death rates

Among the demographic indicators, those related to natural population movements, i.e., births and deaths, for which birth rates and mortality rates were analysed, are particularly relevant. One of the demographic consequences of the progress of societies towards higher stages of development has been the declines in birth and death rates, giving rise to what has been called the demographic transition, which results in the aging of these societies.

Since the latter half of the last century, a downward trend of birth rates (BR) in both groups of countries has been observed. The MENA²¹² countries that started with clearly higher levels (between 33 ‰ in Israel to 53 ‰ in Algeria) than the EU-28, are currently presenting a BR well above those observed in European countries. (MENA countries maintain rates above 20 ‰ in most cases, while these rates in the EU-28 are around 10 ‰.).

As regards mortality rates (DR), in the mid-twentieth century, these were significantly higher in all MENA countries than in the EU-28 group, with the exception of Israel (the only MENA country classified by the World Bank in the group of "high income countries"). However, a significantly higher decrease in their evolution was noted in MENA countries, which currently places them with lower mortality rates than those of most EU-28 countries²¹³.

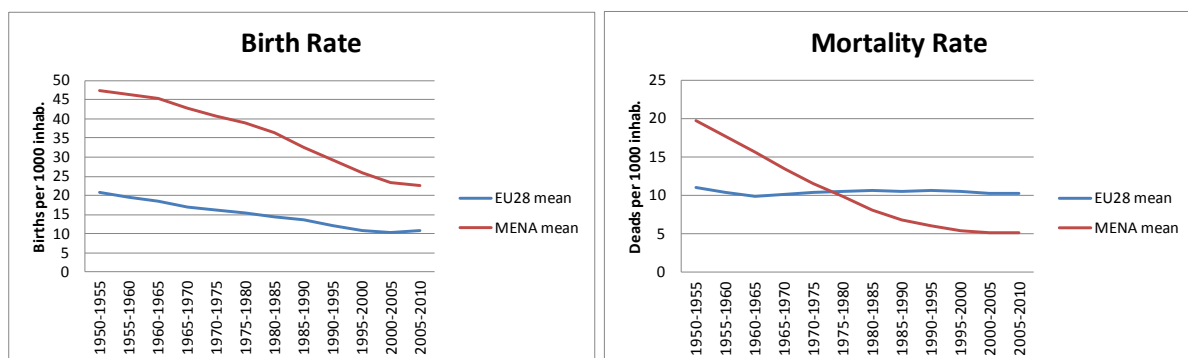


Figure 1. Evolution of BR and MR per thousand in the average of the EU and MENA. Source: Compiled from Population Data (UN, 2013).

5.1.2 Gross National Income per capita

Among socioeconomic factors, income level, measured by per capita gross income, is an indicator of the level of development that is widely used, as a measure of control over resources. Nevertheless, an increase in revenue without improvements in the levels of quality of life can occur. As the UNDP (2013) indicates, "what matters is not only the level of income but also the use given to such income. [...] the key is not in the process of maximising wealth but in the choice that countries make in transforming income into human development". At any rate, a lively discussion persists about whether there is divergence or convergence, i.e., whether the differences between poor and rich countries are increasing or are shrinking. Neoclassical growth models often predict that there will be convergence –that poor

²¹¹ Thus, although educational level would in principle be one of the factors to consider– given that education and literacy have contributed decisively to increasing the level of health by facilitating improvements in nutrition, hygiene and reproductive health–it has been postponed for further analysis with better data.

²¹² All have shown declines in birth rates of around 50% in the last 60 years, except Palestine (-30%), Israel (-36%) and Jordan (-37%).

²¹³ Most MENA lowered their MR more than 70%, or even as much as 80% like Libya. But comparing the MR can lead to confusion on a global analysis in which different demographic structures, in addition to the limitations in the sources used for country estimates, are not discussed.

countries increase their revenues²¹⁴ faster than the rich– but the reality, according to the most recent theories of endogenous growth, does not confirm this forecast.

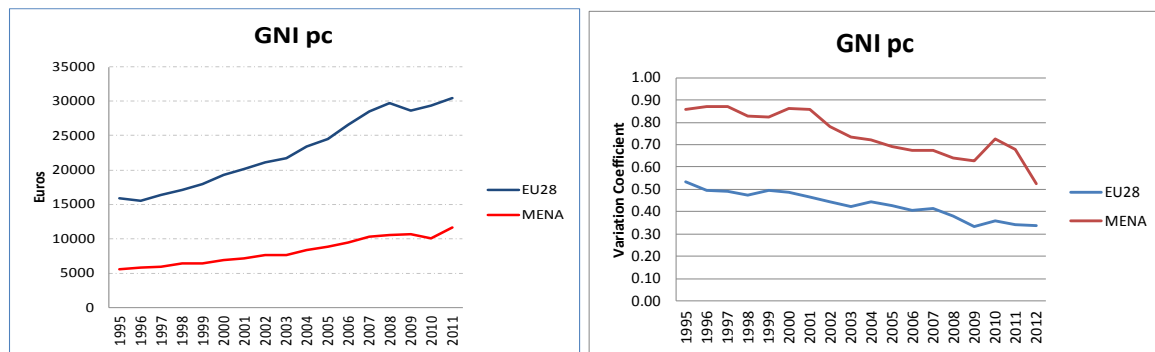


Figure 2. Evolution of the average Gross National Income per capita and its coefficients of variation in the EU-28 and in the MENA. Source: World Health Organization (WHO), Global Health Observatory, Data Repository.

The evolution of per capita income in the period 1995-2011 shows an increase in the average rate of change of both groups of countries, the EU-28 (3.91%) and especially the MENA countries (4.49%), which started from significantly lower values. Regarding the deviations in income levels, the variation coefficients reveal that the dispersion in income levels is relatively higher in the MENA group, and in both cases these dispersions have been reduced in the period studied.

Beta-convergence is a particular measure that makes it possible to confirm the existence of convergence or divergence among income levels. We can say that there is beta-convergence²¹⁵ among the income levels of various countries if it is observed that poor countries have grown more than the rich, that is, if it can be shown that the fact of having a lower income is associated with higher rates of growth. In order to see this, the association between baseline per capita income –measured in natural logarithm– and variations on such income is analysed.

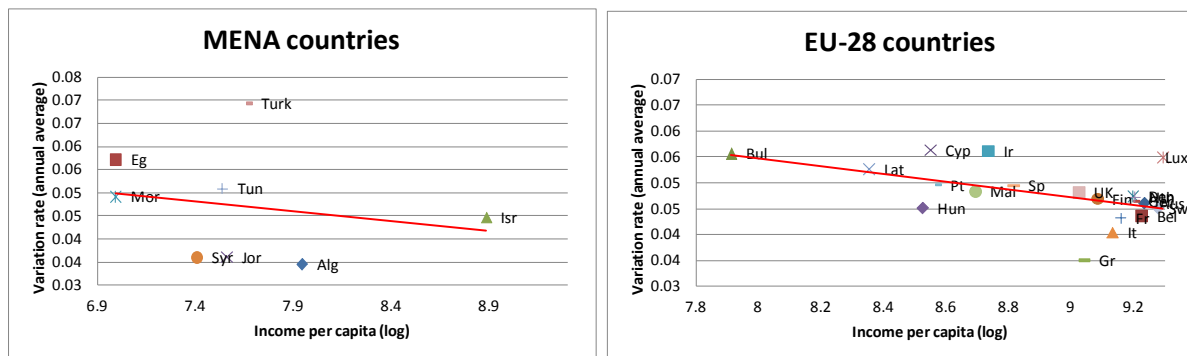


Figure 3. Beta convergence (per capita income [in NL] in 1980 and its variations until 2012). Source: World Health Organization (WHO), Global Health Observatory, Data Repository.

The negative slopes of the adjusted lines in the graphs show a weak convergence in both MENA and EU-28 countries. Similarity of these slopes indicates analogous speeds in the process of convergence in both groups. The issue is that the MENA start from much lower income and more dispersed values than in the case of the EU-28.

However, although there are large differences among groups of countries and regions, the most important ones are the existing inequalities within the countries themselves, as reflected by the values of the Gini coefficient of income. Higher values, the greatest inequality, are in MENA countries, mainly in Tunisia (41.4) and Morocco (40.9), although they are also high in some countries in the EU-28, especially in the newly incorporated (Lithuania, Latvia, Estonia) and between and outside the EU-15, in the Mediterranean area (Italy, Spain and Greece) (UNDP, 2013).

5.2 Health Status

As already discussed, health improvement is a central aspect to the MDGs, and in most developing countries the public sector stands as the main provider of these services. According to the World Bank²¹⁶, to reduce inequities, many nations have emphasised primary care, including vaccination, sanitation, access to clean water and safe maternity initiatives. In

²¹⁴ The growth rates of income influence many factors, such as political decisions of their leaders, the level of education of the people, technology development, etc.

²¹⁵ Defined according to Sala-i-Martin in 1990

²¹⁶ <http://www.bancomundial.org/es/topic/health>

this section, we will rely on comparisons between the values of the two indicators of life expectancy and infant mortality.

5.2.1 Life expectancy

Life expectancy (LE) is considered an essential component of the Human Development Index (HDI). In the past 50 years, LE has increased worldwide more rapidly than ever (IDB, 2008). In 2012, the average LE was 70.1 years, with substantial differences among countries.



Figure 4. Life expectancy at birth, 2011. Source: World Health Organization (WHO), Global Health Observatory, Data Repository.

According to WHO (WHO, 2013), the highest values of this indicator are in the group of EU countries that made up the EU-15 and in Israel, all with values above 80. The rest of the countries from the EU, Eastern Europe, together with the MENA have LE values of around 75 years, with Libya having the lowest value with only 65. But these LE levels have increased significantly in recent years, primarily in the MENA countries, which started mid last century with values well below 50, except for Lebanon and Israel.

5.2.2 Infant mortality

One of the most sensitive indicators of human welfare, also considered an important determinant of HDI, and fourth MDG, is child survival. According to UNDP (2013), in 2010 the global mortality rate of children under five was 55 deaths per 1,000 live births, although irregularly distributed by countries, so that the highest rate is for countries with a low HDI.

This scheme is basically apparent in the countries analysed. Thus, although rates have fallen significantly, the highest rates are shown in MENA countries with lower income and HDI values: Morocco (32), Algeria (30), Egypt (23), etc.

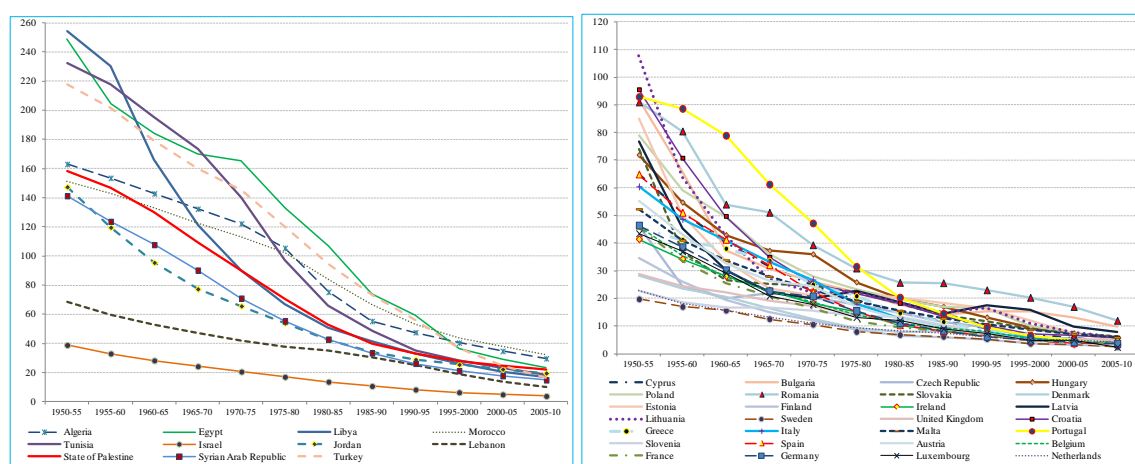


Figure 5. Trends in Infant Mortality Rate. Source: Compiled from Data Population (UN, 2013).

Poor child health may permanently affect the child's cognitive development and subsequently his or her labour productivity as an adult. Historically, a clear association between increased life expectancy and reductions in infant and child mortality has been observed.

In fact, if we perform a regression analysis of the LE data for 2011 of the countries analysed and child mortality rates for children under 5 years, we obtain a clearly significant model ($p = 2.7 \cdot 10^{-7}$ and $R^2 = 0.7242$) where the regression coefficient (-0.4288) indicates that there is an inverse relationship between IM and LE, that shows how IM rate reduces when LE increases.

5.3 Health services funding

In general, countries with higher public spending on health²¹⁷ and education have experienced higher levels of human development, although this may mask local variations (UNDP, 2013). We will focus mainly on the health expenses incurred by the public sector²¹⁸, and taking into account the intended population, i.e., per capita spending.

From the WHO²¹⁹ database of national health accounts we analysed the current situation and the evolution of health spending in the countries considered.

On one hand, we observed that higher levels of public spending per capita on health are in the EU-28²²⁰. European Mediterranean countries are in intermediate levels and the MENA at much lower values, especially Morocco, Syria and Egypt.

In both groups of countries, health expenses have increased significantly since 1995 to 2011, with the cumulative annual average change rates in Turkey (12.85%), Romania (10.95%), Lithuania (8.79%), etc., standing out; while those less advanced in this regard were Lebanon (0.62%) and Libya (1.34%).

Table 3 confirms that the public health expenditures have increased in the period considered, the average for the EU-28 being considerably higher than for the MENA, and that this difference has increased in recent years, and that discrepancies within groups of countries are much higher in MENA than in the EU-28. Furthermore, the convergence within the group of EU-28 has slowed with the crisis (from 2008), slightly increasing the distance between countries, while in the MENA it seems that the increase in the divergence has been greater and has occurred in the last two years.

²¹⁷ Total health expenditure is the sum of public and private expenditure on health as a proportion of the total population. It covers the provision of health services (preventive and curative), family planning activities, nutrition activities, and emergency aid designated for health, but does not include provision of water and sanitation.

²¹⁸ Public health expenditure consists of current and capital spending deriving from government budgets, external borrowing and grants (including international agencies and NGOs) and funding from social health insurance.

²¹⁹ <http://apps.who.int/nha/database>

²²⁰ Notable are the Benelux countries (Luxembourg, the Netherlands and Belgium), some Nordic countries (Sweden and Denmark), and Austria, Germany and France.

Table 3. Descriptive statistics of public expenditure per capita in health (\$-PPP). Source: World Health Organization (WHO), Global Health Observatory, Data Repository.

		1995	2000	2005	2008	2009	2010	2011
TOTAL	Mean	442.67	1,117.45	818.79	1,049.11	1,118.38	1,104.54	1,117.45
	Standard Dev	575.73	1,358.89	1,038.71	1,238.90	1,310.88	1,333.84	1,358.89
	Variation Coeff,	1.30	1.22	1.27	1.18	1.17	1.21	1.22
	Upper Limit	2,005.15	5,794.45	4,611.58	5,100.07	5,515.11	5,660.07	5,794.45
	Lower Limit	26.76	92.86	51.03	76.66	83.89	80.28	92.86
	Range	1,978.39	5,701.59	4,560.55	5,023.41	5,431.22	5,579.79	5,701.59
	Relative range	4.47	5.10	5.57	4.79	4.86	5.05	5.10
	Relative Openness Coeff.	73.93	61.40	89.37	65.53	64.74	69.50	61.40
UE-28	Mean	688.98	1,840.80	1,350.37	1,751.50	1,813.65	1,816.81	1,840.80
	Standard Dev	553.80	1,269.18	977.24	1,131.26	1,216.66	1,244.39	1,269.18
	Variation Coeff.	0.80	0.69	0.72	0.65	0.67	0.68	0.69
	Upper Limit	2,005.15	5,794.45	4,611.58	5,100.07	5,515.11	5,660.07	5,794.45
	Lower Limit	137.12	588.51	415.25	568.01	548.76	588.62	588.51
	Range	1,868.03	5,205.94	4,196.33	4,532.06	4,966.35	5,071.45	5,205.94
	Relative range	2.71	2.83	3.11	2.59	2.74	2.79	2.83
	Relative Openness Coeff.	13.62	8.85	10.11	7.98	9.05	8.62	8.85
MENA	Mean	128.27	276.22	201.74	249.79	288.86	274.17	276.22
	Standard Dev	278.92	398.21	319.18	347.67	346.10	366.33	398.21
	Variation Coeff.	2.17	1.44	1.58	1.39	1.20	1.34	1.44
	Upper Limit	983.19	1,335.83	1,141.14	1,216.36	1,220.47	1,259.05	1,335.83
	Lower Limit	26.76	92.86	51.03	76.66	83.89	80.28	92.86
	Range	956.43	1,242.97	1,090.11	1,139.70	1,136.58	1,178.77	1,242.97
	Relative range	7.46	4.50	5.40	4.56	3.93	4.30	4.50
	Relative Openness Coeff.	35.74	13.39	21.36	14.87	13.55	14.68	13.39

5.3.1 Cluster Analysis

To refine the convergence of countries in both groups, a cluster analysis as exploratory classification technique is performed, using the agglomerative hierarchical method, with data on health per capita spending of government (PHSp), the net income per capita (NIpc) and LE and IM in 2011.

The dendrogram shows the first groups of countries based on these 4 variables, and from it, using the method of k-means partition algorithm we have opted for the 5 cluster model, considering that it best reflects the different typologies. This method offers slight variations in clusters, which are incorporated into the graphic dendrogram.

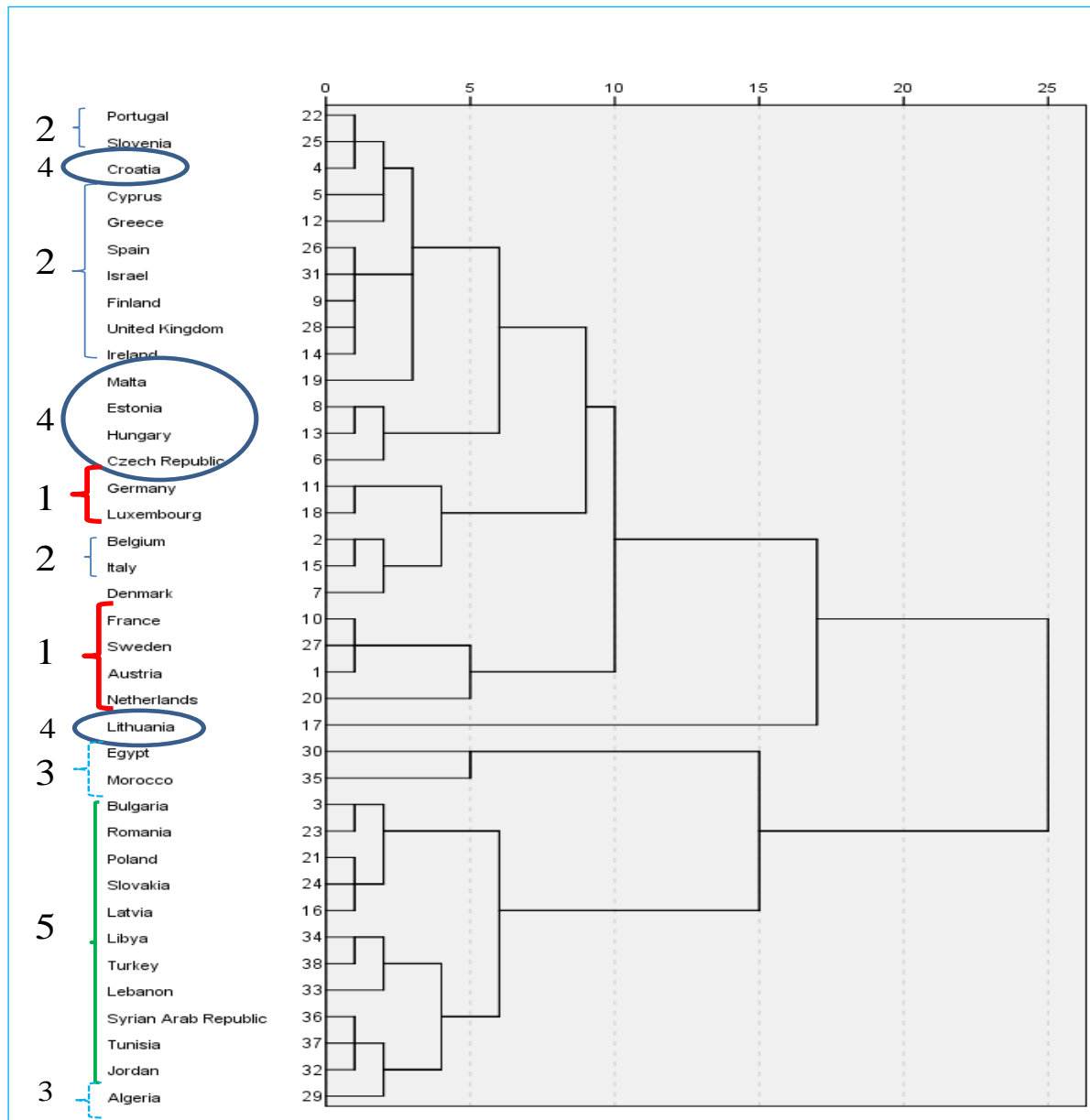


Figure 6. Groupings or cluster as the dendrogram resulting from clustering and k-means algorithm to 5 groups with data PHSp, NIp, IM and LE 2011. Source: Elaborated with SPSS software package with data from World Health Organization (WHO), Global Health Observatory, Data Repository.

Thus, the 5 resulting clusters are the following:

Cluster 1: Germany, Austria, France, Luxembourg, the Netherlands and Sweden; EU-28 countries with higher levels of HPSp (except Belgium and Denmark that are in group 2), higher levels of income, and high levels of LE and low IM.

Cluster 2: Belgium, Cyprus, Denmark, Slovenia, Spain, Finland, Greece, Ireland, Italy, Portugal and the UK; EU-28 countries along with Israel, most with high income, high health expenditures, high LE and low values of IM.

Cluster 3: Algeria, Egypt and Morocco; countries from the MENA group with lower health expenditures and income levels, low levels of LE and very high IM rates.

Cluster 4: Croatia, Estonia, Hungary, Lithuania, Malta and the Czech Republic; new members of the EU-28, with average income levels, not high health expenditures, intermediate values of LE and not very low IM, except for Czech Republic.

Cluster 5: Bulgaria, Slovakia, Latvia, Poland and Romania from the EU-28, and Jordan, Libya, Syria, Tunisia and Turkey, from the MENA group. It is a group of middle and low income, with lower values of LE than the rest of analysed countries, most of them with high values of IM, and all of them with low levels of HPSp.

5.4 Health system organisation: human resources and infant mortality

The debate on the determinants of health shows the limited impact of health services on the health status of the population. The good health of the population is an individual and collective objective sought for a long time.

In 1974, the Lalonde Report, entitled *A New Perspective on the Health of Canadians* (1981), showed, for the first time, from an industrialised country, that biomedical interventions (doctors services, hospitals, pharmacists, etc.) are not the main elements responsible for individual welfare, nor for improvements in the health status of the population. This report identified four areas that were interdependently responsible for the health of individuals: environmental aspects (physical and social), the human biology, lifestyle, and health services (quantity, quality, nature and relationships between population and health resources).

Therefore, health services are just one of many ways to maintain and improve the health of the population. In 1974, the Canadian government issued its advanced time approach. It is not just to provide health services in the traditional sense (beds, hospitals, operating rooms, etc.) but to provide educational services and information to protect the health of Canadians, making them partners of health professionals in preserving and improving their health status.

This approach established by the Canadian government inspired some principles in the Declaration of Alma-Ata (1978). There the rights and obligations of governments and population, with respect to health, the current health definition and the introduction of primary care as the level of provision of health services more tied to environmental determinants of health and citizens' lifestyle, were established.

The process of economic development in industrialised countries and the indisputable advances in specialised care have made us forget the crucial role of primary care services in maintaining the health of the population. In recent years, since the leading causes of death in OECD countries and the development process and changes in habits and lifestyles (Bloom et al., 2011) are linked, a renewed interest in educational services for the health-oriented population is emerging. Progress in cardiovascular diseases as leading causes of death among the population in developed countries creates a renewed interest in healthy lifestyles (Teo, K. et al., 2013).

The results in terms of health of the MENA countries are not solely determined by the development of health services. As noted, health is subject to multiple conditions with more weight than the development of health services in the classical sense. However, it is assumed that there is a clear impact of health services understood as development of health education.

Following this reasoning the relationship between the development of human resources for health services and an intermediate indicator of health outcomes with high impact such as the infant mortality rate is analysed. In this analysis, infant mortality (deaths under age 5 per 1000 live births) depends on the prevalence of doctors and nurses (density per 1000) independently. The descriptive analysis provides large differences in the outcome variable, the average infant mortality rate of 5.6 % in EU28 countries compared to 20.5 % in the MENA countries. These variations correspond to very different endowments in terms of personnel employed in health services.

The results of this analysis show a loss of intensity in the relationship between health workforce and outcomes in terms of infant mortality, as countries are acquiring a greater degree of economic development. The adjustment of a potential function yields a greater association in the MENA than in the UE28 countries. However, the association degree between each of the explanatory variables and the dependent one is strengthened when we include both groups of countries in the regression analysis.

In the graphs, the high level of association between the development of nurse staffing levels and the decline in the infant mortality rate can be observed. This fact is consistent with the development of primary care and its effects in terms of health education, a task mainly developed by the nursing staff. In terms of health policy and convergence between the two groups of countries, there is obvious room for improvement in MENA countries, where the insufficient development of a primary care system with a full territorial coverage is still indisputable.

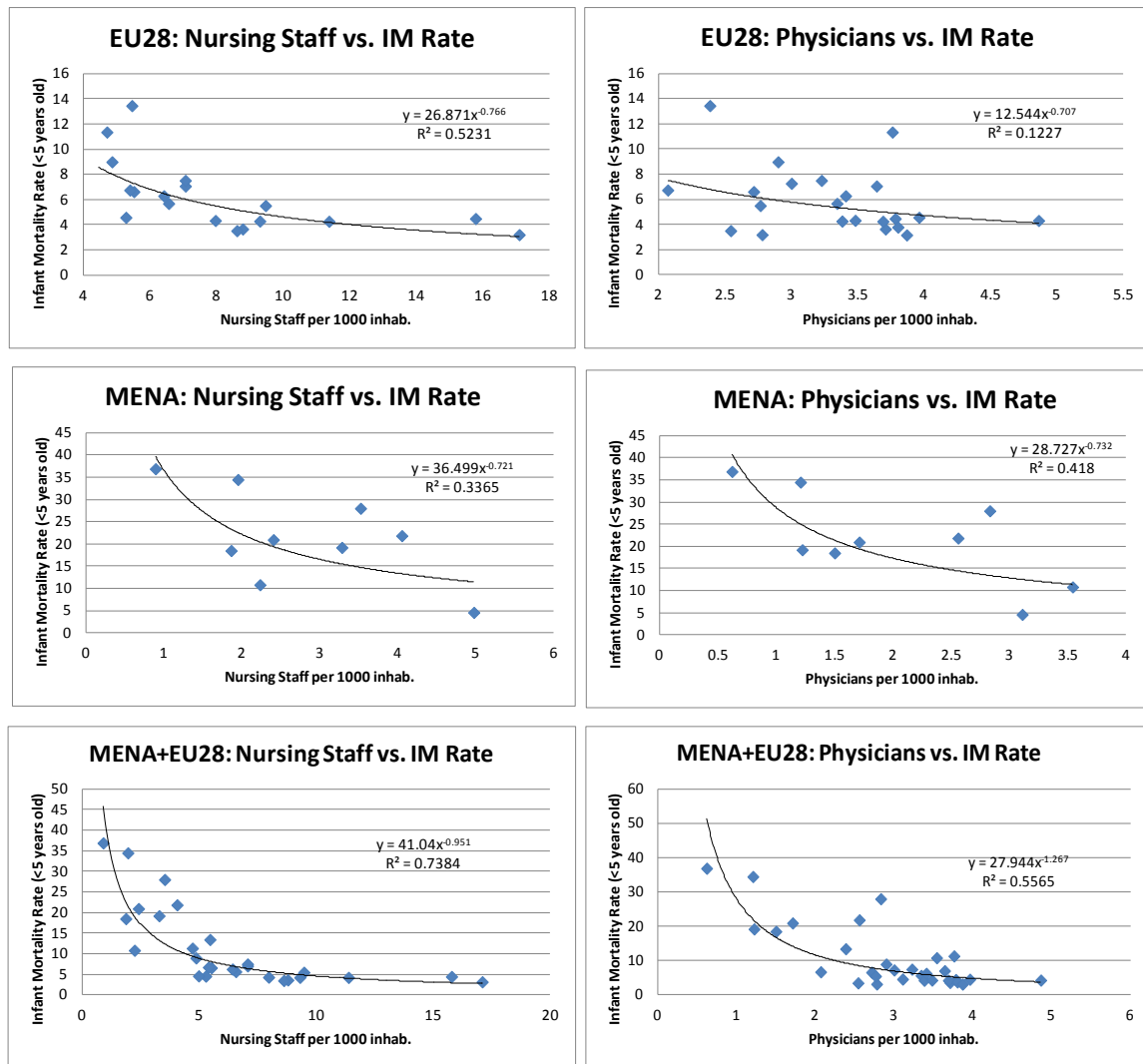


Figure 7. Medical staff versus infant mortality rate (IMR). Source: World Health Organization (WHO), Global Health Observatory, Data Repository.

6 Conclusions

In this work we have seen the evolution of the concept of health from a biomedical perspective to another more related to human development and individual and collective capabilities.

Given the exploratory nature of this study, our conclusions are not centred in the discussion of singular findings, but instead point out a number of key aspects that should guide the development of health services in the group of MENA countries.

As a final review of some key ideas presented throughout this work, we wish to emphasise the following:

- Health is both a result and a determinant factor for economic development. Hence improving health remains central to the MDGs.
- As usually happens in the development of economic growth theories, human capital has become a central element of the circular relationship: health-development-health.
- The importance of health goes beyond the individual component, in that it also links to socio-institutional elements of clear impact on economic policy and particularly in public policy: social participation strategies in the management of health and related services.
- As social policy, health policy is linked to the reduction of inequalities in health and access to health services. In this regard, the WHO has set the goal of universal health coverage.
- Within the framework of the EU, health inequalities have become part of cohesion policy. The Europe 2020 Strategy prioritises the need to ensure universal access to affordable and high quality health care services, including prevention and health promotion.
- Within the EU, health systems and associated services are a key area of attention in the cooperation policy for cohesion among the EU countries through the MAC method. The priorities of the MAC method are specified in the access, quality and sustainability of health systems.

- The volume of resources actually used in the Mediterranean region is well below the initial commitment and further developments in health have minimal financial impact.
- The social realities in terms of health are very different between the two groups, EU-28 and MENA. A large gap is observed in terms of life expectancy.
- Life expectancy is strongly associated with per capita income and the amount of public resources invested in health. The case of infant mortality is a clear example analysed in this work.
- The main concerns in terms of economic policy are also very different. While the EU-28 debates the viability and sustainability of universal and accessible health systems that absorb a high percentage of public resources, MENA countries have clearly inadequate human resource endowments in healthcare services that generate an unbridgeable gap in terms of health outcomes.

Once certain levels of quality in health services have been achieved, the allocation of additional resources does not necessarily lead to an improvement in health outcomes. However, the situation seen in the MENA countries has not yet reached this inefficiency threshold of public resources in health services. Therefore, our final recommendation advocates strengthened national efforts and cooperation within EU projects in the MENA countries' health services. These endeavours would have the aim of seeking to consolidate an effective primary care system with universal coverage and guaranteed accessibility.

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Green Investments and Sustainable Healthcare Systems

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The current economic crisis represents both a threat and an opportunity to design health systems for the future. In the context of advanced economies, health expenditures are rapidly increasing and great concern about their financial sustainability urges a new orientation. Most experts agree that sustainability is unlikely to be achieved through incremental changes. Transformative solutions will be needed, solutions that require cooperation across industry sectors and governments.

This work addresses the healthcare systems sustainability objective from the perspective of reducing the demand of health services. Cooperation across industry sectors is a crucial issue in achieving healthier populations that demand less health care.

This research work poses the question: how are green-investments affecting health and healthcare systems sustainability? Thus, we will try to quantify the financial impact of investments in eco-efficient technologies on healthcare costs and vice versa.

1 Introduction

To increase the sustainability of health systems is one of the four main objectives of the European Programme “Health for Growth”. The reason why EU emphasises sustainable health systems is based on four main challenges: an ageing population of the EU Member States, more effective but also more expensive health technologies, the need for progress in prevention of chronic diseases, and the global and cross-border health threats.

The current economic crisis represents both a threat and an opportunity to design health systems for the future. In the context of advanced economies, health expenditures are rapidly increasing and great concern about their financial sustainability urges a new orientation. Most experts agree that sustainability is unlikely to be achieved through incremental changes. Transformative solutions will be needed, solutions that require cooperation across industry sectors and governments.

To achieve a sustainable health system for the future, societies must reshape demand for health services, reducing the burden of disease by helping people stay healthy and empowering them to manage their health. Health systems can encourage people to develop healthier habits, incentivise healthier consumption, and develop an environment and infrastructure that facilitate population health.

This work addresses the healthcare systems sustainability objective from the perspective of reducing the demand of health services. Cooperation across industry sectors is a crucial issue in achieving healthier populations that demand less health care.

This research work poses the question: how are green-investments affecting health and healthcare systems sustainability? Thus, we will try to quantify the financial impact of investments in eco-efficient technologies on healthcare costs.

The next section is devoted to the methodology followed and presents the main hypotheses defended in the work. The third section offers a summary on what the literature says about our main arguments, which are the following: impact of economic activity on environment, impact of environmental issues on health conditions, impact of health conditions on health systems sustainability, and impact of green investments on health systems sustainability. The results section is based on costs of diseases and the opportunity to finance the transition towards a green economy. Finally, we will present some conclusions oriented to policy action.

2 Methods

By means of a literature review and some empirical estimation we will support the following sequence of hypotheses:

- Economic activity impacts on Environmental issues (literature review, IPAT theory).
- Environmental issues have relevant effects on health conditions (literature review, association IPAT/mortality).
- Health conditions are a crucial factor regarding the sustainability of health systems (literature review).
- Green investments can relieve environmental issues (literature review, empirical).
- Green investments can be a help to health systems sustainability (literature review).

First, we will present what specialised literature says about these relationships.

Then, with data provided by the World Bank, we will calculate the Ehrlich and Holdren index for all countries in the world during the period 1961-2012. This index (IPAT) represents the impact on the environment resulting from economic activity. It combines three variables— the population number, the consumption per capita (affluence), and the technology factor.

Next, by means of a panel data econometric model, we will study the association between this index and mortality rates. In accordance with Amartya Sen, mortality rate will be used as a proxy variable representing the health status of the population.

We will also relate the IPAT index with green investments, i.e., investments that enable economic growth and at the same time improve the environment.

By means of the previous relationships, we will discern the impact of green investment on the IPAT index and the impact of the IPAT index on the health of the population.

From a literature review we will obtain the relationship between environmental factors and health status and the relationship between health status and demand for health care.

3 Literature review

3.1 Impact of economic activity on Environment

As the 2002 United Nations Environment Programme (UNEP) Annual Report stated, the growing attention to issues of sustainable consumption is a natural outcome of decades of work on cleaner production and eco-efficient industrial systems. It represents the final step in a progressive widening of the horizons of pollution prevention— a widening which has gone from a focus on production processes, to products (ecodesign to lower product impacts), then to product-systems (incorporating transport logistics, end-of-life collection and component reuse or materials recycling), and to eco-innovation (new products and product-systems designed for win-win solutions for business and the environment). Action focused on consumption has highlighted the need to address the creation of new systems of production and consumption, systems that might be truly sustainable, environmentally, economically, systems that will enhance the quality and equality of cultural, social and physical existence for all people.

This report includes the consumption equation from Ehrlich and Holdren (Ehrlich and Holdren, 1971). This equation describes the relationship between population, consumption and environmental impact in approximate terms as the following:

$$TEI = P \times UC/ph \times EE^{-1}$$

Where TEI is total environmental impact, P is population, UC/ph is (average) units of consumption of products and services per head of population, and EE is the environmental efficiency of the production, use and disposal of those units.

This equation makes it easy to visualise the importance of considering levels of consumption of goods and services (per head) and the resources used (and waste generated) to produce those goods and services. The expression “patterns of consumption” is a term that seeks to capture both of these variables.

Consumption pressure per head describes the (aggregated) product of the two terms UC/ph and the inverse of EE.

It is from such an equation that the concept of factor 4 (etc.) emerges— being the level of change in EE that can be achieved through technical and organisational improvements (cleaner production, product re-design, etc.)

If the intent is to reach some specific level of TEI (say for CO₂ production) in a given period, then estimates of the likely population growth over that period, as well as the likely rise in the average level of consumption per head (from development, GDP growth, etc), will define the factor of improvement in EE necessary to compensate for this rise.

Arguments that arise over the role of population growth in environmental degradation can also be clarified with reference to this equation, since it is clear that the issue is the product of population numbers times the average consumption pressure per head. Rebound effects arise from a relationship between UC/hp and EE, where improvements in EE generate increased consumption per head.

Factor X and dematerialisation are two relevant concepts also included in this UNEP Report.

This technical improvement in the environmental /resource efficiency of production and products is encapsulated in two widely used concepts: Factor Four (also Factor 10, Factor 20, etc.), from Weizsäcker, Lovins and Lovins (1997) and their book of the same name, and dematerialisation.

Factor Four refers to a halving of total material input into the economy while doubling wealth and welfare.

Dematerialisation is more a general approach which proposes a progressive and significant reduction in material throughput in the economy, i.e., reducing material flows in production and products, whilst maintaining (or increasing) value.

Both of these concepts suggest a shift in the economy towards an increasing value for ‘natural capital’: ‘Natural capital includes all the familiar resources used by mankind: water, minerals, oil, trees, fish, soil, air... it also encompasses living systems.’ (Hawken, Lovins, and Lovins, 1999).

‘Dematerialisation’ and ‘factor X’, like the umbrella term ‘eco-efficiency’ are strategies for delinking the economy from resource-use and waste-production.

After the initial formulation of the consumption equation, it was better known under a different formula, the IPAT equation. This equation represents environmental impact, (I), as the product of three variables, (1) population, (P); (2) affluence, (A); and (3) technology, (T). The IPAT equation and related formulas were born, along with the modern environmental movement, circa 1970.

IPAT is an identity simply stating that environmental impact (I) is the product of population (P), affluence (A), and technology (T).

$$I = PAT$$

Although generally credited to Ehrlich, Commoner also plays an important role in the formulation of the IPAT equation. Commoner's work in his popular 1971 book, *The Closing Circle*, became the first to apply the IPAT concept with mathematical rigour.

In order to make operational the three factors that influence I, environmental impact, Commoner defined I as "the amount of a given pollutant introduced annually into the environment." His equation, published in a 1972 conference proceedings (Commoner, 1972a), is the following:

$$I = \text{Population} \times \frac{\text{Economic good}}{\text{Population}} \times \frac{\text{Pollutant}}{\text{Economic good}}$$

Population is used to express the size of the U.S. population in a given year or the change in population over a defined period. Economic good is used to express the amount of a particular good produced or consumed during a given year or the change over a defined period and is referred to as "affluence." Pollutant refers to the amount of a specific pollutant released and is thus a measure of "the environmental impact (i.e., amount of pollutant) generated per unit of production (or consumption), which reflects the nature of the productive technology" (Commoner 1972a, 346).

Used in this way, the equation takes on the characteristics of a mathematical identity. On the right-hand side of the equation, the two Populations cancel out, the two Economic goods cancel out, and what remains is: $I = \text{Pollutant}$.

$$I = \text{Population} \times \frac{\text{Economic good}}{\text{Population}} \times \frac{\text{Pollutant}}{\text{Economic good}}$$

His main value, then, is to estimate the contribution of each of the three terms to total environmental impact.

$$\text{Pollution} = (\text{population}) \times (\text{production/capita}) \times (\text{pollution emission/production})$$

The very first time the reference $I = P \times A \times T$ appears in writing is as part of the Critique and Response in 1972, in which Ehrlich and Holdren take the previous Commoner equation from a footnote from *The Closing Circle* and, express it as $I = P \times A \times T$.

Since the 70's, different approaches and interpretations have appeared from the initial equation mainly regarding the environmental consequences of the various factors, P, A and T. During the 80's, special attention was paid to the T factor. In essence, a new generation of technological optimists finds that experiments in changing human behaviour to vary the course of P and A are highly uncertain. The concepts of the IPAT equation are at the core of the emerging field of industrial ecology in the 90's. Industrial ecology has been described as the "marriage of technology and ecology" and examines, on the one hand, the environmental impacts of the technological society, and, on the other hand, the means by which technology can be effectively channelled towards environmental benefit (Graedel and Allenby 1995). Graedel, however, has some revisionist thinking about A, the affluence term (Graedel, 2000). Graedel has suggested that the essence of the A term resides in its cultural and behavioural attributes.

In conclusion, this equation and its different interpretations underline the relevant impact of economic activity on environment. Technology, although associated with both disease and cure for environmental harm, is a critical factor in environmental improvement (Chertow, 2001). This emphasises the role of innovation (technological and social) in improving environment.

3.2 Impact of environmental issues on health conditions

In 1974 the Lalonde report *A New Perspective on the Health of Canadians* pointed out the existence of the so-called counter-forces which constitute the dark side of economic progress. They include environmental pollution, city living, habits of indolence, the abuse of alcohol, tobacco and drugs, and eating patterns. The report emphasised that physicians, surgeons, nurses and hospitals together spend much of their time in treating ills caused by adverse environmental factors and behavioural risks. It confirmed that self-imposed risks and the environment are the principal or most important underlying factors in each of the five major causes of death between age one and age seventy. So, unless the environment is changed and the self-imposed risks are reduced, the death rates will not be significantly improved. It presented the first proofs and measures on the total effect of air pollution on health, establishing a direct cause-and-effect relationship between air pollution and sickness.

The report introduced the term Health Field. The term "health care system" is limited to the system by which personal health care is provided. The term "health field" is much broader and includes all matters affecting health. Health field can be broken down into four broad elements: human biology, environment, lifestyle, and health care

organisation. These components have different importance in relation with the major problems of health: human biology (27%), **environment (19%)**, lifestyle (43%), and health care organisation (11%).

The environment category includes all those matters related to health which are external to the human body and over which the individual has little or no control. Individuals cannot, by themselves, ensure that foods, drugs, cosmetics, devices, water supply, etc., are safe and uncontaminated; that the health hazards of air, water and noise pollution are controlled; that the spread of communicable diseases is prevented; that effective garbage and sewage disposal are carried out; and that the social environment, including the rapid changes in it, do not have harmful effects on health.

The Lalonde approach can be considered innovative because it includes some social determinants of health into the concept of environmental conditions. In this sense it referred to economic deprivation, social change, new technologies, and the pursuing of private pleasure instead of common good.

Finally, it concludes that future improvements in the level of health of Canadians lie mainly in improving the environment, moderating self-imposed risks, and adding to our knowledge of human biology.

With Lalonde's Report a new line of research was opened and it continues nowadays. Currently, the World Health Organisation (WHO) promotes a number of studies on the relationship between environment and health.

Outdoor air pollution is a major environmental health problem affecting everyone in developed and developing countries alike. WHO estimates that some 80% of outdoor air pollution-related premature deaths were due to ischemic heart disease and strokes, while 14% of deaths were due to chronic obstructive pulmonary disease or acute lower respiratory infections; and 6% of deaths were due to lung cancer.

Some deaths may be attributed to more than one risk factor at the same time. For example, both smoking and ambient air pollution affect lung cancer. Some lung cancer deaths could have been averted by improving ambient air quality, or by reducing tobacco smoking.

A 2013 assessment by WHO's International Agency for Research on Cancer (IARC) concluded that outdoor air pollution is carcinogenic to humans, with the particulate matter component of air pollution most closely associated with increased cancer incidence, especially cancer of the lungs. An association also has been observed between outdoor air pollution and increase in cancer of the urinary tract/bladder.

Ambient (outdoor air pollution) in both cities and rural areas was estimated to cause 3.7 million premature deaths worldwide per year in 2012; this mortality is due to exposure to small particulate matter of 10 microns or less in diameter (PM₁₀), which cause cardiovascular and respiratory disease, and cancers.

People living in low- and middle-income countries disproportionately experience the burden of outdoor air pollution with 88% (of the 3.7 million premature deaths) occurring in low- and middle-income countries, and the greatest burden in the WHO Western Pacific and South-East Asia regions.

The latest burden estimates reflect the very significant role air pollution plays in cardiovascular illness and premature deaths – much more so than was previously understood by scientists.

Most sources of outdoor air pollution are well beyond the control of individuals and demand action by cities, as well as national and international policymakers, in sectors like transport, energy waste management, buildings, and agriculture.

In addition to outdoor air pollution, **indoor smoke** is a serious health risk for some 3 billion people who cook and heat their homes with biomass fuels and coal. Some 4.3 million premature deaths were attributable to household air pollution in 2012. Almost that entire burden was in low-middle-income countries as well.

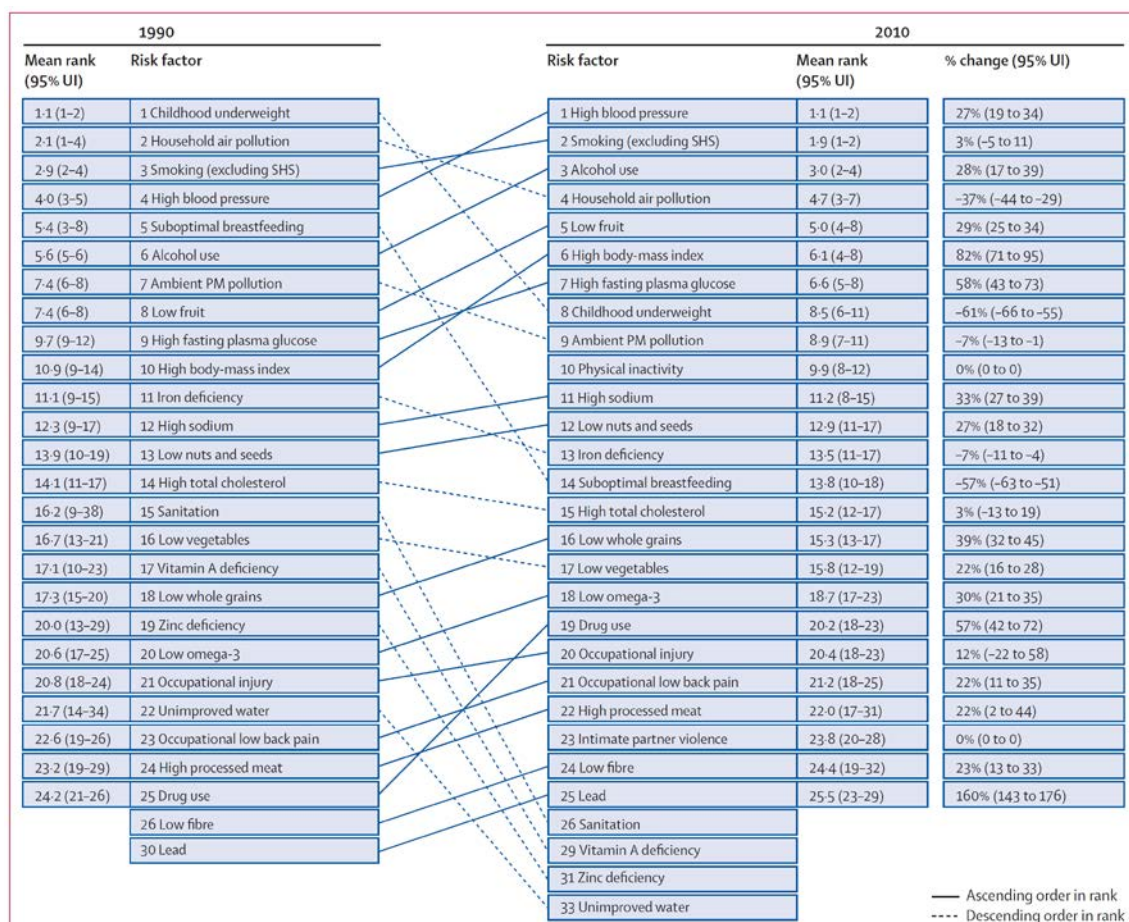
The 2005 "WHO Air quality guidelines" offer global guidance on thresholds and limits for key air pollutants that pose health risks. The Guidelines apply worldwide and are based on expert evaluation of current scientific evidence for the following:

- particulate matter (PM)
- ozone (O₃)
- nitrogen dioxide (NO₂)
- sulphur dioxide (SO₂), in all WHO regions.

The paper from Lim et al. published in 2012 estimated deaths and disability-adjusted life years (DALYs, sum of years lived with disability [YLD], and years of life lost [YLL]) attributable to the independent effects of 67 risk factors and clusters of risk factors for 21 regions in 1990 and 2010. They estimated exposure distributions for each year, region, sex, and age group, and relative risks per unit of exposure, by systematically reviewing and synthesising published and unpublished data. They used these estimates, together with estimates of cause-specific deaths and DALYs from the Global Burden of Disease Study 2010, to calculate the burden attributable to each risk factor exposure compared with the theoretical-minimum-risk exposure. These calculations incorporated uncertainty in disease burden, relative risks, and exposures into our estimates of attributable burden.

Among other findings this article highlights that in 2010 the three leading risk factors for global disease burden were high blood pressure (7.0% [95% uncertainty interval 6.2–7.7] of global DALYs), tobacco smoking including second-hand smoke (6.3% [5.5–7.0]), and alcohol use (5.5% [5.0–5.9]). In 1990, the leading risks were childhood underweight (7.9% [6.8–9.4]), household air pollution from solid fuels (HAP; 7.0% [5.6–8.3]), and tobacco smoking including second-hand smoke (6.1% [5.4–6.8]). However, in most of sub-Saharan Africa, childhood underweight, HAP, and non-exclusive and discontinued breastfeeding were the leading risks in 2010, while HAP was the leading risk in south Asia.

Table 1. Global risk factor ranks with 95% UI for all ages and sexes combined in 1990, and 2010, and percentage change PM=particulate matter. UI=uncertainty interval. SHS=second-hand smoke. An interactive version of this figure is available online at <http://healthmetricsandevaluation.org/gbd/visualizations/regional>.



Although, fortunately, both risk factors related with air pollution (Household Air Pollution and Ambient Particulate Matter Pollution) show a decreasing trend between 1990 and 2010, these two factors in sum represent in 2010 13.6% of total global disability-adjusted life-years lost.

Air pollution is already known to increase risks for a wide range of diseases, such as respiratory and heart diseases. Studies indicate that in recent years exposure levels have increased significantly in some parts of the world, particularly in rapidly industrialising countries with large populations. The most recent data indicate that 223,000 deaths from lung cancer worldwide resulted from air pollution²²¹ in 2010.

The specialised cancer agency of the World Health Organization, the International Agency for Research on Cancer (IARC), announced in 2013 that it has classified outdoor air pollution as carcinogenic to humans²²². After thoroughly reviewing the latest available scientific literature, the world's leading experts convened by the IARC Monographs Programme concluded that there is sufficient evidence that exposure to outdoor air pollution causes lung cancer. They also noted a positive association with an increased risk of bladder cancer. Particulate matter, a major component of outdoor air pollution, was evaluated separately and was also classified as carcinogenic to humans.

Volume 109 of the IARC Monographs evaluations is based on the independent review of more than 1000 scientific papers from studies on five continents. The reviewed studies analyse the carcinogenicity of various pollutants present in outdoor air pollution, especially particulate matter and transportation-related pollution. The evaluation is driven by findings from large epidemiologic studies that included millions of people living in Europe, North and South America, and Asia (Loomis et al., 2013).

In 2004, after the recognition that air pollution might have an impact on cardiovascular disease, the UK Department of Health asked the Committee on the Medical Effects of Air Pollutants (COMEAP) to advise on the possible effects of outdoor air pollutants on cardiovascular disease in the UK. The Committee formed a Sub-Group which reviewed the literature in detail and drafted a report. The Committee on the Medical Effects of Air Pollutants undertook an extensive review of the evidence for these effects, to assess possible mechanisms and identify areas for future research. In 2006,

²²¹ <http://www.iarc.fr/en/publications/books/sp161/index.php>

²²² The summary evaluation was published by The Lancet Oncology online on Thursday, 24 October, 2013.

eighteen months later, it published a report in which the state of the art in all respects was presented— short and long terms effects as well as the confirmation that modest reductions in exposure will result in significant health gains.

The principal conclusions of the report are that clear associations have been reported between both daily and long-term average concentrations of air pollutants and effects on the cardiovascular system, reflected by a variety of outcome measures including risk of death and of hospital admissions; these associations are likely to be causal in nature; and, although it is not possible to be certain which components of the ambient pollution mixture are responsible for these effects, it is likely that fine particles play an important role (Straif; Cohen; and Samet, 2013).

Another relevant environmental issue related to health is the exposure to chemical pollutant, the so called endocrine disrupters. The 2013 Berlaymont Declaration on Endocrine Disrupters expressed the concern of 89 scientists actively engaged in endocrine disrupter research. This Declaration gathers the conclusions of the scientific convention organised by the European Commission to discuss forthcoming policy initiatives for endocrine disrupters.

The Declaration confirms the concern about the prevalence increase of endocrine-related diseases, higher than it has ever been. The disease burden continues to increase in the EU and globally. Evidence is strengthening that environmental factors, including chemical exposures, play a role in these phenomena.

Some recent reports from the European Environment Agency, in a European Commission— a funded report and an assessment conducted under the auspices of the World Health Organisation and the United Nations Environmental Programme²²³— point out the incremental prevalence of endocrine-related diseases in the European Union and globally:

- In some EU Member States, large proportions of young men have semen quality so poor that it will seriously affect their chances of siring children.
- There is a dramatic rise in breast cancer in Eastern and Southern European EU Member States.
- With the exception of high prevalence countries such as The Netherlands and Austria, all EU countries are experiencing strong rises in prostate cancer. Similar trends exist for other hormonal cancers, including those of the testes, endometrium, ovaries, and thyroid.
- Neurobehavioural disorders, and thyroid diseases and disorders affecting brain development, represent a high and increasing paediatric disease burden in countries where these disease trends have been followed.
- The prevalence of obesity and its comorbidity factors, type 2 diabetes, and metabolic syndrome have increased dramatically in almost all EU Member States.

Finally, these scientists call we the European Commission to implement a regulatory regime that classifies endocrine disrupters by using weight-of-evidence approaches and to develop a targeted research strategy for endocrine disrupting chemicals (EDCs) as part of Horizon 2020.

3.3 Health systems sustainability and health conditions

In accordance with the Ladonde Report (1974), economic progress has brought to us an evident improvement in the health status of the population, but also some problems such as environmental pollution, city living, habits of indolence, the abuse of alcohol, tobacco and drugs, and non-desirable eating patterns. These counterforces have been at work to undo progress in raising the health status. Thus, they constitute the dark side of economic progress.

Nevertheless, from a different point of view, health is not just a value in itself. It is also a driver for growth. Only a healthy population can achieve its full economic potential. The health sector is driven by innovation and a highly qualified workforce. The healthcare sector is one of the largest in the EU. It accounts for approximately 10% of the EU's gross domestic product and employs one in ten workers, with a higher than average proportion of workers with a tertiary-level education.

Health therefore plays an important role in the Europe 2020 agenda. In its Communication of 29 June 2011 'A budget for Europe 2020' the Commission stressed that 'promoting good health is an integral part of the smart and inclusive growth objectives for Europe 2020. Keeping people healthy and active for longer has a positive impact on productivity and competitiveness. Innovation in healthcare helps take up the challenge of sustainability in the sector in the context of demographic change', and action to reduce inequalities in health is important to achieve 'inclusive growth'.

All these reasons explain why from the public and institutional perspective, sustainability of health systems is a permanent concern. The financial crisis has further highlighted the need to improve the cost-effectiveness of health systems. Member States are under pressure to strike the right balance between providing universal access to high-quality health services and respecting budgetary constraints.

²²³ European Environment Agency (2012): The impacts of endocrine disrupters on wildlife, people and their environment – the Weybridge +15 report. <http://www.eea.europa.eu/publications/the-impacts-of-endocrine-disrupters>

Kortenkamp A, Martin, O, Faust M, Evans R, McKinlay R, Orton F, Rosivatz E (2012) State of the art assessment of endocrine disrupters. DG Environment project contract number 070307/2009/550687/SER/D3. http://ec.europa.eu/environment/chemicals/endocrine/pdf/sota_edc_final_report.pdf.

UNEP WHO (2013) State of the science of endocrine disrupting chemicals – 2012 (Editors: Bergman A, Heindel JJ, Jobling S, Kidd KA, Zoeller RT. http://www.unep.org/pdf/9789241505031_eng.pdf

In this context, the European Commission considers that supporting Member States' efforts to improve the sustainability of their health systems is crucial to ensure their ability to provide high quality healthcare to all their citizens now and in the future. And, with this aim, in 2011 it launched the Health for Growth Programme. This Programme has four objectives and three of them maintain a close alignment with our hypotheses. They are to encourage innovation in healthcare, to increase the sustainability of health systems, to improve the health of EU citizens, and to protect citizens from cross-border health threats.

In this line, the Budget for Europe 2020 assigns the following funding distribution for the health objectives (Table 2):

Table 2. EU Budget for Health 2014-2020. Source: European Commission, COM(2011) 500 final.

Total proposed budget 2014-2020	€2.75 bn
of which	
• Food Safety	€2.2 bn
• Health for Growth Programme	€396 million
• Consumers Programme	€175 million

Most of the financial resources go to the Food Safety Programme, clearly oriented to cope with health problems derived from endocrine disrupting chemicals.

Not only are there institutional instances where concern is shown about sustainability of healthcare systems, but also private economic agent are alarmed about this worry. The World Economic Forum (WEF, 2013) considers that health systems sustainability is unlikely to be achieved through incremental changes. Instead, transformative solutions will be needed – solutions that require cooperation across industry sectors and governments, and thereby challenge the current boundaries of healthcare.

This report stresses the differences between “healthcare system” and “health system”. Both are often used interchangeably, but there is an important distinction between them. The healthcare system describes the institutions, facilities, and actors involved in delivering healthcare services. This report refers to healthcare system activities as supply-side. The health system denotes a much wider range of institutions and actors beyond the traditional so-called health sector, including actors who directly or indirectly influence and affect health in a society (e.g., food and beverage companies).

The health system is regarded as having a more balanced focus on both supply and demand, with demand referring to policies and services aimed at encouraging healthy lifestyles and preventing disease. Pushing the boundaries of the healthcare system to include a wider ecosystem of influences on health pushes stakeholders to better consider the demand side and questions the way in which governance of health is currently organised.

That demand side perspective is crucial for our aim in warning about the environment impact on health and health systems sustainability.

The Forum explored the fundamental influences on healthcare expenditure, creating a simple conceptual model of demand and supply elements.

Growing demand for healthcare is driven primarily by four factors: an ageing population, an explosion of so-called lifestyle diseases, a rise in public expectations, and a lack of value-consciousness among healthcare consumers.

On the supply side, the cost of care continues to rise, while resources are not allocated in the best way. The rise in unit costs is driven by the advent of new therapies and technologies, together with innovative strategies that focus on better outcomes rather than lower costs. This is compounded by poor allocation of resources in a healthcare delivery system often closed to change (because of vested interests), and an incentive structure that does not always reward value creation.

With the aim of identifying critical uncertainties, by means of interviews with experts, the Forum identified 20 drivers of change for health systems grouped into five dimensions. One of these five dimensions was the “environmental”, and it includes four key drivers: climate change, pollution and toxicity, incidence of infectious diseases, and population sanitation.

Health systems sustainability concern has also been treated from a more theoretical Economics perspective. The apparently unrelenting growth in the GDP-share of health spending (SHS) has been a recurrent issue of policy concern. Recent studies raise the question about the existence of an equilibrium limit (Ehrlich and Yin, 2013). This issue has been left open in the latest dynamic models, which take income growth and population aging as given (Hall and Jones, 2007). Ehrlich and Yin developed a human capital-based endogenous growth model treating these variables as endogenously determined. Their model expands the basic elements of the endogenous growth models of Lucas (1988),

Becker et al. (1990), and especially Ehrlich and Lui (1991) and Ehrlich and Kim (2007) to integrate health and life expectancy as a basic endogenous variable in addition to fertility and human capital formation.

The conclusion of their analysis also puts an emphasis on investments in children's survival to adulthood as yielding high social return because they protect, and thus induce, investments in the knowledge component of human capital, which promotes economic growth. By the same token, policies that induce larger investment in education increase the motivation to protect this investment by investing in life protection and adopting a healthier lifestyle, which promotes the probability of survival to older age. By contrast, the analysis indicates the limitations of health financing policies that encourage the use of remedial care services covered by reimbursement insurance policies, as these policies encourage excessive use of remedial medical services at the expense of the more individually and socially productive life protection and preventive medical care.

3.4 Impact of green investments on environment

In 2012, the OECD published a definitional paper (Inderst, Kaminker, and Stewart, 2012) that aims to provide a comprehensive review of the concepts and definitions related to "green" investments (also variously referred to as "clean", "sustainable", and "climate change" investments) that are currently used. The paper examines how "green" investments are defined across different asset classes (equities, bonds and alternative investments), as well as providing some estimates of the size of these investments. The paper concludes that, given the lack of consensus on the usage and definition of the term "green", the most productive approach could be to take an open and dynamic attitude towards definitions and standards, with international institutions and governments adopting a "governance approach to green investment". They propose taking an open and dynamic approach to definitions and standards based on the cause (i.e. green growth, climate change policy, etc.). The science and the general understanding of the environment, climate change, and resource scarcity are evolving as are clean technologies, which are being developed and scaled-up to deal with these challenges.

Green "investment" is a very broad term. It can be stand-alone, a sub-set of a broader investment theme or closely related to other investment approaches such as SRI (socially responsible investing), ESG (environmental, social and governance investing), sustainable, long-term investing, or similar concepts.

As an example, the IMF has provided a macroeconomic definition of green investment. A recent IMF Working Paper by Eyraud et. al. (2011) refers to green investment as "the investment necessary to reduce greenhouse gas and air pollutant emissions, without significantly reducing the production and consumption of non-energy goods". It covers both public and private investment. There are three main components of green investment. These are low-emission energy supply (including renewable energy, bio fuels and nuclear), energy efficiency (in energy supply and energy-consuming sectors), and carbon capture and sequestration (including deforestation and agriculture).

Investors' attention to climate change, resource efficiency and green issues in general, has been rising in recent years and investor initiatives in this respect are growing in support. The paper provides some indications on the market volume of green investments. It is important to note that green investment has traditionally been mostly embedded within a broader approach. In fact, the current investment volumes in ESG / SRI assets, estimated at over USD 10 trillion, are a multiple of those in "pure" green investments (estimated in the tens or hundreds of billions, depending on the definition).

In recent years, the debate has not been focused on the impact of green investment on the environment. Instead, green investments are considered to be the only ones viable for achieving economic growth. Economic growth and sustainability are interdependent— you cannot have one without the other— and greening investment is the prerequisite to realising both goals.

Dramatic upgrades in technology, skills, policies and business models, along with an aligned public consciousness, are needed for the transition to a green growth pathway. Infrastructure investment required for sectors such as agriculture, transport, power and water under current growth projections stands at about US\$ 5 trillion per year to 2020 (WEF, 2013b). Additional investment needed to meet the climate challenge—for clean energy infrastructure, sustainable transport, energy efficiency and forestry—is about US\$ 0.7 trillion per year.

Considerable progress has been made in transitioning to green growth. Global investment in renewable energy in 2011 hit another record; up 17% in 2010 to US\$ 257 billion. This represented a six-fold increase from 2004 and was 93% higher than in 2007, the year before the global financial crisis. Global agricultural productivity growth rates are exceeding overall population growth rates, and, since 1990, more than 2 billion people have gained access to improved drinking water sources. Energy efficiency is widely recognised as providing economic opportunities and improved environmental security, while the fuel efficiency of vehicles has more than doubled since the 1970s.

Such progress, however, remains inadequate. Progress in green investment continues to be outpaced by investment in fossil-fuel intensive, inefficient infrastructure. The challenge will be to enable an unprecedented shift in long-term investment from conventional to green alternatives to avoid locking in less efficient, emissions-intensive technologies for decades to come.

The Green Investment Report (WEF, 2013b) introduces several interesting definitions related to our objectives:

- Green growth: growth that eradicates poverty and reduces inequality, while combating climate change and respecting a range of other planetary boundaries.

- Green investment: a broad term closely related to other investment, approaches such as socially responsible investing (SRI) and sustainable, long-term investing. As in the case of most green investment, it is necessary to retrofit existing infrastructures and develop new ones.
- Infrastructure can be defined as the basic physical and organisational structures and facilities needed to operate a society or enterprise that enables economic growth and facilitates the everyday life of citizens. Infrastructure can refer to transport (vehicles, roads, rail), water, energy, and telecommunications.
- Green infrastructure: infrastructure that enables economic growth and at the same time improves the environment (quality of air, health of citizens), helps conserve natural resources, reduces emissions, and enables adaptation to climate change. Green infrastructure could include renewable and low-carbon power plants, sustainable and low-carbon vehicles and transport, and energy-efficient, climate-resilient buildings.

From a perspective more focused on health, the report *Transport for Health: The Global Burden of Disease from Motorized Road Transport* (Global Road Safety Facility, 2014) underscores the urgent need for green investments to spread improvements in transport pollution and safety across world regions. Road injuries now rank as the world's eighth-leading cause of death and the number-one killer of young people ages 15 to 24. While the disease burden attributed to ambient air pollution has declined among richer regions such as Western Europe and North America, over the last 20 years it has risen sharply in South Asia and East Asia has been seen.

Pollution from vehicles is the cause of 184,000 deaths globally, including 91,000 deaths from ischemic heart disease, 59,000 deaths from stroke, and 34,000 deaths from lower respiratory infections, chronic obstructive pulmonary disease, and lung cancer.

This report concludes that road injuries are a major contributor to the Global Burden of Disease. Thus, rapidly scaling up road safety programs alongside the expansion of transport is vital for saving lives while promoting development. Mitigating the health risks requires a long-term investment strategy to build the capacity of national institutions, so they can actively manage safety and mobility performance through targeted interventions. Its final recommendation is a systematic approach and a long-term investment strategy, rather than isolated efforts with specific interventions.

Housing is another field in which green investments are needed. Residential buildings contributed close to 18% of direct carbon dioxide emissions from energy combustion in 2008, with 11% due to household use of grid electricity and district heating, and the remainder due to emissions at household level (e.g. cooking and heating with gas, coal, oil, etc.) (WHO, 2011). At the same time, indoor smoke from solid fuel combustion is the eighth most important risk factor in burden of disease and is responsible for 2.7% of the global burden of disability-adjusted life years (WHO, 2004).

4 Results

A way to connect environmental problems and their root causes, according to the aforementioned IPAT equation, would be through the above scheme to make environmental degradation dependent on the number of people, the average of resources used by each person (measured by the GDP per capita) and the amount of environmental pollution per unit of resource (which could be measured by the number of tons of CO₂ per capita released into the atmosphere). Thus, in developing countries, the size of the population and the resulting degradation are often the most decisive factors. However, in developed countries, the main components are the high level of resource utilisation and the pollution generated.

With data provided by the World Bank, we have calculated the Ehrlich and Holdren index for all countries in the world (1961-2012). Then we compared the results, country by country, with mortality rates and R&D investments. Mortality rates, according to Amartya Sen (Sen and Kliksberg, 2007), give the best picture of health and disease levels in a population. We have also employed R&D investments in our comparison to reflect the efforts made by economic agents to improve the situation, by putting technological innovations in the service of sustainability.

We have made a first econometric estimation through panel data techniques. For this we used the data provided by the World Bank, from 1961 until 2012, such as GDP per capita, total tons of greenhouse gases that are released into the atmosphere per unit of consumption and total population, for each of the 205 countries registered. With these three variables, and following the Ehrlich and Holdren design, an index of environmental impact was built. Once this index was developed, we built a first model to analyse the relationship between the environmental impact index and mortality rates. This model ratifies a positive and significant relationship between index environmental impact and the mortality rate, indicating the damage that climate change is causing on mortality.

Dependent Variable: MORTALITY
Method: Panel Least Squares
Sample (adjusted): 1961 2012
Periods included: 52
Cross-sections included: 205
Total panel (unbalanced) observations: 8368

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INDEX_IMPACT	4.17E-10	1.26E-10	3.318459	0.0009
C	9.995998	0.027939	357.7751	0.0000
Effects Specification				
Cross-section fixed (dummy variables)				
Period fixed (dummy variables)				
R-squared	0.840410	Mean dependent var		10.03761
Adjusted R-squared	0.835373	S.D. dependent var		5.628845
S.E. of regression	2.283865	Akaike info criterion		4.519846
Sum squared resid	42307.29	Schwarz criterion		4.735820

This model ratifies the impact of economic activity on environment and also the effects of environment on health as established in the literature.

In a second estimate, we analysed the relationship between the calculated environmental impact index and global investments in R&D.

Dependent Variable: RSDV
Method: Panel Least Squares
Sample (adjusted): 1961 2012
Periods included: 52
Cross-sections included: 205
Total panel (unbalanced) observations: 8368

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INDEX_IMPACT	2.82E-10	2.14E-11	13.19228	0.0000
C	0.113991	0.004754	23.97937	0.0000
Effects Specification				
Cross-section fixed (dummy variables)				
Period fixed (dummy variables)				
R-squared	0.416135	Mean dependent var		0.142141
Adjusted R-squared	0.397707	S.D. dependent var		0.500709
S.E. of regression	0.388588	Akaike info criterion		0.977634
Sum squared resid	1224.763	Schwarz criterion		1.193608
Log likelihood	-3833.422	Hannan-Quinn criter.		1.051392
F-statistic	22.58170	Durbin-Watson stat		0.453008
Prob(F-statistic)	0.000000			

These results indicate that a positive and significant relationship is also observed, between these two variables. Thus, in general, those countries with greater environmental problems allocate more resources in R&D investments.

But our main concern is to quantify the effect of green investments on health systems sustainability, i.e., a quantification of healthcare costs reductions derived from the use of a technology with a higher level of eco-efficiency.

We based our analysis on two main environmental issues, air pollution and endocrine disrupting chemicals. The relationship between health systems sustainability and environment improvements is totally circular. Environmental improvements reduce premature deaths and health costs, and funds liberated from healthcare can be dedicated to green investments.

The economic analysis works with data obtained from the literature review that was carried out.

Economic cost of diseases can be calculated by two different methodologies. The first one is based on determining the theoretical value of DALYs lost due to environmental causes. The second one is based on computing the healthcare costs, direct plus indirect.

The literature estimates that additional investment needed to meet the climate challenge—for clean energy infrastructure, sustainable transport, energy efficiency and forestry—is about US\$ 0.7 trillion per year.

Furthermore, in accordance with the Global Burden of Disease Study for 2010, household air pollution plus ambient particulate matter pollution are responsible for 6.6 million DALY lost annually. If we adopt US\$ 30,000 as the DALY unit value, the result is US\$ 0.2 trillion per year, almost the third part of the needs for additional green investments.

From a different factor related to environment, the EU estimates health savings up to 31 billion per year possible from reducing EDC exposures. Out of an estimated cost of around EUR 636 billion for endocrine diseases, if EDCs contribute to only 2-5% of the total health costs from endocrine-related chronic diseases, an EU policy change such as the phasing out of these hazardous substances and promoting safer alternatives could save Europeans up to €31 billion each year in health costs and lost productivity.

To give a context to these figures, total healthcare expenditure in the European Union (EU28) in 2010 represented 9.5% of GDP (OECD Factbook, 2013), or €1,166 billion (Eurostat, 2012). The healthcare bill for chronic disease is €700 billion. (50) These figures do not include indirect health costs.

Finally, we will focus our attention on cancer, one group of diseases closely related to air pollution and EDC, and with a great economic impact.

The total economic impact of premature death and disability from cancer worldwide was \$895 billion in 2008. This figure, which does not include direct costs of treating cancer, represents 1.5 percent of the world's GDP.

Using a formula accepted by public health researchers and economists to measure the global burden of disease, there were 83 million years of “healthy life” lost due to death and disability from cancer in 2008.

The top three cancers that account for the highest number of healthy life years lost were lung cancer (15.5 percent), stomach cancer (9.6 percent), and liver cancer (8.6 percent).

The top three cancers that caused the most economic impact globally were lung cancer (\$188 billion), colon/rectum cancer (\$99 billion), and breast cancer (\$88 billion). All of them are closely related to air pollution and EDC exposition.

Cancer causes the highest economic loss of all of the 15 leading causes of death worldwide. The economic toll from cancer is nearly 20 percent higher than heart disease, the second leading cause of economic loss (\$895 billion and \$753 billion, respectively).

The US National Cancer Institute, with methodology based on cost of treatments, estimated for 2010 an annual cost of US\$ 124 billion for all types of cancer, of which more than US\$ 12 billion correspond to lung cancer.

Cancer cost the EU €26 billion in 2009, with health care accounting for €1.0 billion (40%). Across the EU, the healthcare costs of cancer were equivalent to €102 per citizen, but varied substantially from €16 per person in Bulgaria to €184 per person in Luxembourg. Productivity losses because of early death cost €42.6 billion and lost working days €9.43 billion. Informal care cost €23.2 billion. Lung cancer had the highest economic cost (€18.8 billion, 15% of overall cancer costs), followed by breast cancer (€15.0 billion, 12%), colorectal cancer (€13.1 billion, 10%), and prostate cancer (€8.43 billion, 7%) (Luengo-Fernandez et al., 2013).

This study also has a methodology based on costs. In a population-based cost analysis, authors evaluated the cost of all cancers and also those associated with breast, colorectal, lung, and prostate cancers. The study takes into account country-specific aggregate data for morbidity, mortality, and healthcare resource use from international and national sources. It includes healthcare costs from expenditure on care in the primary, outpatient, emergency, and inpatient settings, and also drugs. Additionally, the costs of unpaid care provided by relatives or friends of patients (i.e., informal care), lost earnings after premature death, and costs associated with individuals who temporarily or permanently left employment because of illness were also considered.

5 Conclusions

Currently most developed countries accept that Healthcare systems must adapt to demographic changes and a growing demand for care, and make the best use of innovative health technologies. Health system reforms must guarantee universal access to high-quality care and improve the efficiency and financial sustainability of the health systems.

In order to guaranty the financial sustainability of health systems, it is necessary to reduce the incidence of preventable diseases. Cancer, heart disease, diabetes, respiratory, mental, and other chronic diseases represent great suffering to citizens and come at a huge cost to society and the economy. In addition, most of these diseases maintain a growing tendency along with environment deterioration, climate change, and unhealthy lifestyles.

Greening global economic growth is the only way to satisfy the needs of today's population and up to 9 billion people by 2050. Nowadays, despite signs of increasing private finance into clean energy and other green investments, there remains a considerable shortfall in investment. Closing this gap is a collective task and one that we cannot afford to fail. Public finance, linked to smart, enabling policies, has a critical role to play. Given the scarcity of public funds, governments' contributions to closing the gap will depend on their effectiveness in mobilising private investment.

From the point of view of policy implications, the results support the need for inter-sector cooperation. Green investment is a broad term closely related to other investment approaches, such as socially responsible investing (SRI)

and sustainable, long-term investing. So its benefits are global and could liberate a huge amount of money from health systems. In this sense, promoting green investments in other sectors and vice versa can greatly reinforce the sustainability of health care systems as well.

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Impacts of decentralization on hospital services in peripheral geographical areas

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The first Cancer Center outside a big city was founded in 2008 in Portugal, in order to save the patients from long commuting and to reduce financial and social costs to the State, the patients and their families. Given such a measure, the question is whether radiotherapy service became more efficient geographically speaking. As a result, this article aims to describe the decentralization impacts on radiotherapy service in this Cancer Center located in the Trás-os-Montes and Alto Douro region, in Portugal. A descriptive research was conducted, focusing on economic and social aspects. The data were collected through document analysis, and the sample consisted of 232 patients under treatment from July 2009 to June, 2010. The results indicate significant differences as the costs of the treatment center in the outskirts were compared to a center located in a large urban area. This difference would be even more significant if the inherent social costs of moving patients could have been taken into account.

Introduction

The debate on hospital management-related issues is intense. Some of the major issues include the quality and efficiency of services performed by healthcare providers. Health economics has gained autonomy and projection, with an ever-increasing highlight (Carvalho, 2008). Healthcare costs play an important role in overall resource consumption and public spending (Barros, 2006); cancer care is not an exception.

Regarding cancer, an increase in investments has brought scientific and technical development, especially in diagnosis and treatment care, eventually increasing their access to related patients. However, the same did not happen with radiotherapy (RT) services, as the available resources in Portugal are too centralized.

Cancer occurrence is measured per 100,000 inhabitants per year, often by incidence and mortality rates. The number of diagnoses or deaths are calculated respectively, in a given time period, within a population or region. Information on the cancer incidence is supervised by the International Agency for Research on Cancer (IARC) and covers about 21% of the world population. Regarding Portugal, the Regional Cancer Registry (ROR) is divided by area: north (Roreno), center (ROR center) and southern (south ROR). Actually, few countries hold a national registry (e.g. Singapore and Canada). In the United States of America (USA), these registries are in charge of the National Cancer Institute and the National Program of Cancer Registries of the Centers for Disease Control, which study or encompass approximately 95% of the US population (DeVitta, Lawrance and Rosenberg, 2008).

Due to the growing and aging population, and the cancer spreading into the Western lifestyle, an increase in number of newly diagnosed cases of cancer is expected – 12 million worldwide in 2007, 5.4 million in the developed countries and 6.7 million in the developing countries. Regarding cancer-related deaths – 7.6 million worldwide, 2.9 million in the developed countries and 4.7 million in the developing countries. Prognosis estimates, by 2050, 24 million new cases and more than 16 million deaths every year. Higher figures are expected for low and middle resource countries (DeVitta, Lawrance and Rosenberg, 2008).

In Portugal, the Northern Region Regional Cancer Registry – RORENO – plays a key role in providing accurate information through a deep analysis of epidemiological data on the disease. These registries are based on the population in the districts of Braga, Bragança, Porto, Viana do Castelo and Vila Real. The data are standardized through the direct method, taking the world and European population as the standard (Bento, 2009).

The first decentralized Cancer Center was inaugurated in 2008, in the city of Vila Real - northern region of Portugal. This Cancer Center was built in the Trás-os-Montes and Alto Douro Hospital Center, E.P.E (CHTMAD), outside any major urban centers. The purpose was to bring oncological treatment units close to patients, to prevent the patients commuting to the Porto city downtown, which is almost 100km away, and to reduce financial and social costs to the State, its users and their families. Ultimately, this cancer center would also expect to be an asset for the region.

After over three years since its inauguration, several questions have been raised: Has radiotherapy service become more efficient? Are there advantages in geographically decentralized radiotherapy services? Is the size of staff and equipment enough to meet the users' demands? These questions justify the objective of this research: to describe the decentralization impacts on the radiotherapy service provided at the Cancer Center at the Trás-os-Montes and Alto Douro region, in Portugal.

Oncological Disease and Healthcare Efficiency

The word cancer is often adopted to identify a wide range of diseases, which are malignant tumors are characterized by an uncontrolled growth and division of cells, which acquire the ability to multiply and invade other tissues and organs (Pazdur, Wagman, Camphausen, & Hoskins, 2009).

In 2005, the Northern Region Regional Cancer Registry - RORENO - estimated 12,950 new malignant neoplasia cases in the northern region, corresponding to an incidence rate of 455.3/105 people among males (7,219 new cases) - 56% cases; and 338.2/105 people among females (5,731 new cases) - 44% cases. It accounted for a 6% increase in reported cases for 2004 (Bento M. J., 2009). In that region, the most common diseases were colorectal, prostate, breast and stomach cancer. Together, they accounted for about half of the cancer pathologies in the northern region (Bento, 2009). By 2015, cancer cases are expected to grow 22% in people over 65, and a 50% increase is expected in people over 80 years of age. Such figures call for a demand for more new radiotherapy services (Coffey, Degerfält, Osztavics, van Hedel, & Vandeveld, 2004). Radiotherapy is a clinical and scientific modality targeted to the treatment of cancer patients. It requires ionizing radiation alone or combined with other treatment modalities (surgery, chemotherapy). In some cases, patients with benign pathologies may also be treated with radiotherapy. Radiotherapy focus on providing an accurate prescribed dose with a well-defined, minimal-damage amount to the surrounding tissues, aiming to eliminating the disease, prolonging survival, increasing quality of life, as well as achieving healing or palliative results and symptomatic relief (Williams & Thwaites, 2000). Radiotherapy may eliminate the disease, extend survival, increase quality of life or achieve curative or palliative results and symptomatic relief (Williams & Thwaites, 2000). However, it is a complex process, requiring expensive equipment such as a CT simulator, linear accelerator and a network planning system for efficient, accurate transfer of all treatment-related information of every patient (Williams & Thwaites, 2000).

Regarding human resources, international policies recommend that a specialist doctor be available for every 250 patient a year, three physics experts for each linear accelerator, and four radiotherapy technicians for every eight working hours. The three main modalities adopted in cancer treatment are surgery, radiotherapy and chemotherapy. The World Health Organization recognizes that at least 50% of all patients require radiotherapy at some stage of the disease (Coffey, Degerfält, Osztavics, van Hedel, & Vandeveld, 2004).

A study conducted by The Swedish Council on Technology Assessment in Health Care (2003) estimates that, among the cured cases, the cancer is cured in 49% of cases through surgery, 40% through radiotherapy alone or with other modalities, and 11% through chemotherapy alone or with other modalities. As increase of 20% to 30% in the number of required treatments is expected for the next 20 years (Slotman, Cottier, Bentzen, Heeren, Lievens, & van der Bogaret, 2005). As radiotherapy plays a major role among the limited healthcare resources, its cost-efficiency should be assessed for all clinical situations that might require its adoption (Ploquin & Dunscombe, 2008).

Because of healthcare spending and lack of resources, intensified by an increasing demand for cancer-related care and the expensive nature of the involved technology, most developed countries have been pursuing more efficient practices for this sector (Jacobs, Smith, & Street, 2006). This scenario justifies the purpose of this article, which is to identify the effectiveness of radiotherapy services for cancer treatment.

Radiotherapy Training Costs - An Economic Analysis

Every economic analysis focuses on different types of costs: the resources provided by a Healthcare System and the costs charged directly to patients (DeVitta, Lawrance and Rosenberg, 2008). Although several cost classifications may be adopted, Andrade (2010) adopts just two: direct and indirect. The direct costs regard the production process (admission, the personnel's working time, medication and exams) and treatment-related costs to be handled by the patients and their family (commuting, meals, accommodation, etc.). The indirect costs are related to the consequences of the production process, such as the loss of productivity in the patient's workplace and the patient and their family themselves, as well as the absenteeism. The indirect costs include also the time spent in commuting, the waiting time until the treatment begins, etc. (DeVitta, Lawrance, & Rosenberg, 2008). Pereira and Franco (2001), in turn, adopt the terminology fixed and variable costs. Fixed costs include all hospital, unit or service operations, and the expenses with infrastructure, equipment and salaries. Variable costs may vary according to the production, and depend on the outcomes, such as medical and clinical materials, consumables and fees. Other classifications may be taken into account: intangible costs, which are difficult to estimate, such as psychological costs, pain, loss, suffering, change of environment and social adaptation, etc.

Cancer patient-associated costs are social and financial costs handled by the patients and the involved society, as their treatment and commuting are covered by the national healthcare system and other subsystems. In most cases, all these costs are covered directly or indirectly with public funds (Cunha, 2011).

The price of a single radiotherapy session paid for each hospital is estimated by crossing a reference price called Homogeneous Diagnosis Group (GDH) 409 (Ordinance No. 132/2009, 2009) and the specific Case-Mix index. For users of other healthcare subsystems, that price does not depend on the institution (Ordinance No. 110-A/2007, 2007).

Before this service became available, the cancer patients who live in the Vila Real district had to commute an average of 150km in order to be treated. The distance traveled from their homes to their former treatment facility (another reference institution) called the Portuguese Institute of Oncology (IPO-Porto), located in the city of Porto, became unbearable, as most of these patients do not live in the city center of Vila Real. Such distance, as well as a lack of adequate transportation, worsened the patients' suffering conditions. All points mentioned above then justify the analysis of both economic and social costs of radiotherapy patients from the Vila Real district at the Vila Real Hospital, focusing on the current process and the process before such radiotherapy service was available.

Radiotherapy Service and the Region

Since the 1990s, the number of patients with cancer the northern region of Portugal has increased from 7,000 to approximately 23,000 cases. The number of registered patients in the district of Vila Real and Bragança accounts for small percentage, mostly below 5%. It should be noted, however, that the district of origin of 50% to 60% of those cancer patients is unknown. After the analysis of published records from the last five years (2001–2005), an average of 439 registered oncology-related patients were found.

Records from the Roreno showed an average of 439 cancer patients in the Vila Real district. 50% to 60% of these cases required radiotherapy, which was adopted (assuming that this average remained in the analyzed years) in 220 to 263 cases. However, apart from these figures, an average of 10,638 patients of district of origin unknown were registered in the northern region each year (2001–2005).

According to Table 1, over 727 cancer patients supposedly live in the Vila Real district, considering the number of patients without population registration. Such results infer that the decentralization of radiotherapy services at the CHTMAD meets the needs of patients from the Vila Real district. The CHTMAD service consists of a multidisciplinary team responsible of a specific activity in an efficiently workflow manner. Regarding the basic equipment, this unit is equipped with a high-energy linear accelerator and a TC/simulator. The physical devices are interconnected through information and communication systems in order to harmonize people and equipment-related processes (Cunha, 2011).

From the Study Objectives to the Sample Characterization

The abovementioned scenario justifies this study, which adopts an observational and descriptive-quantitative methodology and an economic approach. It aims to assess whether the decentralization of radiotherapy services at the CHTMAD, a new way of delivering healthcare services in a peripheral region of Portugal, has proven to be efficient, based on the patients' treatment and commuting costs (subsidized) at the IPO-Porto.

The objective of this study was to describe a new delivery of healthcare services by identifying the efficiency rates regarding their existence and functioning in various economic and social aspects. This objective resulted from questions such as: how efficient is this new, geographically decentralized modality of radiotherapy service?

Two cost equations were adopted, one for the CHTMAD and the other for the IPO-Porto. The dependent variable was the total radiotherapy service costs for each institution. This variable included fixed costs and variable costs of the radiotherapy treatment handled by the State, carried out in each institution, as well as the commuting costs. The overall costs consisted of personnel, equipment and commuting distance (in km)-related costs. Other attribute or characterization variables were considered, such as gender, age, pathological group, the patient's healthcare system, treatment sessions (total number based on outpatients and inpatients), new patients per month, district and town of residence.

According to Oncology Hospital Reference Network (RRHO), a protocol signed by the Ministry of Health and the CHTMAD in March 16, 2010 established that the CHTMAL would henceforth admit only patients from the Vila Real district (Ministry of Health, 2010). Based on this protocol, the CHTMAD admitted, between July 1, 2009 and June 30, 2010, 254 patients for radiotherapy service (according to internal electronic records from the CHTMAD RT service). The sample of this study selected 232 from these 254 cancer patients, who underwent the new treatment between July 1, 2009 and June 30, 2010, covering one year of analysis. Of the total sample, 224 patients belong to the National Healthcare System (96.6%) and eight belong to other healthcare sub-systems (3.4%). Data were collected through document analysis of records and data available in the institution's computer systems. The users' general and characterization variables were accessed. The data were computer-processed on Excel 2007 and SPSS (Statistical Package for Social Sciences) software, version 18.0.

Of the 232 patients in the sample, 98 were female and 134 were male. Their mean age is 66.81, the mode being 69 and the standard deviation, 11.53. The minimum age was 36 years and the maximum age, 96 years. 9.5% were born in the Bragança district, 82.3% in the Vila Real district (and the city of Lamego, as this city's hospital belongs to the CHTMAD, although the facilities are located in the Viseu district), 3.9% in the Porto district and 4.3% were from districts outside the northern region.

The most common carcinomas registered for the male patients during the analyzed period are prostate, accounting for 18.53% of the total cases. For the female patients, breast carcinomas were the most common, accounting for 17.67% of the cases, followed by rectum, anus and anal canal-related cancers, accounting for 14.66% of both genders. Finally, trachea, bronchus and lung tumors accounted for 13.36% of both genders.

On the (dis) advantages of the Availability of Radiotherapy Services in the Trás-os-Montes and Alto Douro Region

During the study period, 204 subjects were outpatients and 16 were inpatients. The remaining 12 were one or the other at some stage of radiotherapy. 6,117 treatment sessions were performed, 5,784 of which in outpatients (Hospital de Dia) and 333 sessions in inpatients. Of the 232 subjects who underwent an average of 26 treatment sessions, 125 had to commute (54%). Of the remaining 107 subjects, 16 were inpatients throughout the whole treatment (7%), so no clinical or social need of commuting was detected. The others did not have any transportation subsidy.

The total healthcare system costs regarding patient status (inpatient or outpatient) and the amount of treatments was estimated in €2,921,443.68 (euros). This figure was obtained by adding the multiplications of the number of treatments performed per patient per unit cost, taking into account their status (outpatient or inpatient) and the healthcare system to which they belong.

Commuting costs were estimated in €149,155.24 (euros). The data were collected from the CHTMAD central transportation department's computer system (SONHO), and took into account the patient's commuting distance (route: town of residence-CHTMAD-town of residence), waiting time and number of treatments. This figure was obtained by adding the multiplications of the number of treatments performed per patient per unit cost, taking into account their status (outpatient or inpatient) and the commuting subsidy costs in kilometers, based on the abovementioned route. The distance in km was calculated through a "Via Michelin" simulator (available on <http://www.viamichelin.pt/>), which selects the most appropriate route.

The final costs registered by the IPO-Porto were calculated by adopting the proportion applied to the CHTMAD, which paid the transportation companies. The amount reached €149,155.24 (Euro), accounting for 66.67% of the cost in km (€23,711.00). Therefore, based on the distance in km that the in-treatment patients would travel if they had to commute to the IPO-Porto, the value was multiplied by 66.67%, reaching a total value of €348,619.73 (euros). Once the cost of each treatment session is calculated according to the contract program (ICM) of each institution and the DRG, the final costs would also be different if the treatment were conducted at the IPO-Porto (Ministry of Health, 2009).

According to Table 2, the total treatment costs for the patients covered by the NHS are lower for the CHTMAD than the IPO-Porto, and below the reference price. The final treatment costs (commuting costs and treatment costs added) for the patients in the sample at the CHTMAD were €2,771,818.90. Healthcare system, treatment regimen and number of treatments per regimen were taken into account. If the same services had been conducted at the IPO-Porto, their final costs would have reached €2,921,443.68 (commuting costs and treatment costs added).

The average cost for each patient treated at the CHTMAD is approximately €13,235.34, which is the total spent on commuting (€149,155.24) added to the total spent on treatment (€2,921,443.68) and then divided by the number of patients (232). Conversely, if these patients had undergone treatment at the IPO-Porto, the average cost per patient would have reached approximately €13,450.17. The average treatment costs at the IPO-Porto were calculated by adding the total spent on commuting (€348,619.73) with the total spent on treatment (€2,771,818.90) and then dividing it by the same number of patients (232).

The difference between the average cost of each institution is of approximately €214.83 per patient. This figure was obtained by subtracting the average treatment cost per patient at the IPO-Porto from the average treatment cost per patient at the CHTMAD. Therefore, for those 232 patients, a total gain of approximately €50,000 was achieved. This amount could be applied to improve this and other services.

In addition to the actual and effective costs, if the social-related costs (commuting and quality of life) of which the patients were spared could be added to the equation, that difference would be even more significant. As a consequence, the new modality of radiotherapy service provided at the CHTMAD not only has added financial value to the region as a whole, but it has also improved the social welfare for its residents.

From the Discussion of Results to the Study's Main Findings

Based on the results previously shown, a discussion and a critical analysis may be conducted in order to compare the most significant data to some of the most relevant studies collected from the literature.

In short, the sample of this study accounted for 58% males and 42% females. The most common tumors were prostate (18.53%), breast (17.76%), rectum, anus and anal canal-related (14.66%), followed by trachea, bronchus and lung-related cases (13.36%). These data are similar to the incidence rates identified in the northern region of Portugal. Of the 170 subjects, 60 were over years-old, accounting for 73% of the sample. The period analyzed had 6,117 treatment sessions. 94.6% of which in outpatients and 5.4% in inpatients, accounting for an average of 26 treatment sessions by patient. Of the 232 patients in the sample, 39% have not been reimbursed for any kind of commuting for medical or social purposes.

The radiotherapy working steps and processes at the CHTMAD services are performed as described in the bibliography, from the diagnosis to the follow-up stages. Equipment and human resources are provided throughout all steps and actions for an accurate, efficient treatment.

After the abovementioned processes, some questions regarding the efficiency of such innovation and the implementation of a decentralized radiotherapy service might be answered.

In contrast with the IPO-Porto, the radiotherapy services at the CHTMAD, located in an inner region of Portugal (Vila Real), not only showed a lower cost, but they also managed to treat more patients, thus proving to be more efficient.

The average total cost per patient who underwent radiotherapy at the CHTMAD was approximately €13,235.34. If these patients had undergone treatment in the other reference institution (IPO-Porto), the costs would have reached approximately €13,450.17 per patient. These €214 per patient difference may not seem significant. However, as time and commuting-related social costs, loss of working time (for example, labor) and the patients and their families adapting to a quality of life are added, this difference becomes a lot more significant.

Moreover, Portugal accounts for around 4,000 new cancer cases per million every year. Given that the Vila Real district had about 225,000 inhabitants in 2004 (Correia et al., 2005), a total of 900 new cancer cases are expected in that district. Radiotherapy was expected to be necessary in 50% to 60% of these new cases (Pereira, Soares, Grilo, Lopes, Monsanto & Costa, 2008). This percentage accounts for 450 to 540 new cases per year only in the Vila Real district. Should the population of Bragança be taken into account, the figures would add up to 290-350 new patients every year. However, the one-year period sample (232 new patients out of 254) suggests that, despite the region's installed capacity, some cancer patients are still transferred to other service units.

The social cost of a region without radiotherapy services is translated in uncomfortable commuting for patients who are already under physical and psychological stress. It is worth remembering the impact of the loss of working days and hours (absenteeism) and the reduction of socialization on the patients' lives, as well as the family-related costs throughout the process.

Another advantage is that this new service provides both physical and human resources required for an accurate, precise radiotherapy treatment. As for the linear accelerator, the national recommendation establishes one device for every 400 cancer patients. This new facility complies with such norm, given that 232 cancer patients are treated every year. However, from a macro perspective, and taking the needs of all Trás-os-Montes region into account, this facility is short of accelerators, requiring not one but two devices (Nunes, et al., 2002).

In addition, the number of dedicated personnel (three full-time and one part-time physicians, and one full-time and two part-time healthcare physicists) surpasses the number of healthcare providers per patient treated every year recommended in international guidelines. The number of radiotherapy technicians is also in accordance to the recommended. If the whole region is considered, the number of professionals is appropriate.

Cancer is the leading cause of death and the second leading cause of death in the European Union (Coffey, Degerfält, Osztavics, van Hedel, & Vandeveld, 2004), accounting for approximately 4,000 new cases per million people, especially among the elderly. The aging population process may cause a significant increase in the number of cancer cases, which will eventually increase the demand for more and more efficient treatment units (Coffey, Degerfält, Osztavics, van Hedel, & Vandeveld, 2004). All considered, a network of integrated care for the cancer patients in the medium term is of utmost importance, so more unique, specialized cancer care units are added to the currently operational integrated units that provide primary, ongoing care. Thus, treatment and follow up conditions cancer patients must be improved, focusing not only on efficient, high-quality care, but also on close-distance facilities to the community.

This research aimed to assess the performance of a new form of providing radiotherapy services. To do so, it analyzed operational, economic and social aspects, as well as the location and the productivity conditions. The comfort and quality of life for the population were also taken into account, as this new service was closer to its users. However, the social cost for the patients who need to commute to other locations in order to undergo treatment needs further analysis. This issue should be the starting point of further researches.

The implementation of this new form of radiotherapy service in the city of Vila Real not only has decentralized the treatment process in large urban centers but has also provided comfortable conditions to patients throughout an average of 26 sessions (corresponding to 26 working days). Consequently, this new modality has shown cost-related advantages to the healthcare system, and has proven to be beneficial to those who need them.

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Using Interactive Research and Constructive Method in Adapting Business Model Thinking to Service Logic

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The purpose of this paper is to increase the knowledge of application of interactive research and constructive method in adapting business model thinking to service logic. This paper explains how these empirical research approaches were applied in the development of Service Logic Business Model Canvas. The process took 18 months and involved a large number of practitioners from various industries as well as academics. As the result, this paper evaluates the usability of the interactive research and constructive method in the context of service research. It finds both advantages and challenges in using these methods.

1 Introduction

Qualitative research includes a large number of research methods. The most well-known methods are in-depth interviews, case studies, focus groups, observation, ethnography, grounded theory, and action research (Denzin; Lincoln, 1994). Crowdsourcing, netnography, sentiment analysis, hybrid textual analysis, and text mining are examples of new qualitative methods (Guercini, 2014). Two qualitative research methods have received little attention in the existing literature, namely interactive research (Gummesson, 2001, 38-41) and constructive method (Kasanen et al., 1993). These methods are potentially powerful when the purpose is to develop scientific theory and at the same time develop practically relevant constructions, models, or solutions. This paper relates to an empirical research in which these methods were used in adapting business model thinking to service logic. A new service design tool was developed in this project, called Service Logic Business Model Canvas (Ojasalo; Ojasalo, 2014). The literature includes very little knowledge of use and applicability of interactive research and constructive method. Thus, there is a clear need to increase the knowledge of this area. Our paper responds to this knowledge gap with the purpose to increasing the knowledge of application of interactive research and constructive method in adapting business model thinking to service logic.

The rest of this article is organized as follows. First, it discussed the nature of interactive research and constructive method. Then, it describes the empirical research process in which these methods were used. In this context, it also briefly explains the outcome of the empirical process. Then, based on the observations and experience during the research process, it evaluates advantages and challenges of using interactive research and constructive methodology in service research context.

2 Interactive and constructive methods

2.1 Qualitative research

The term “qualitative research” is an umbrella concept encompassing a wide range of different tools, techniques, and procedures (Punch, 2005; Creswell, 1998). Johnson et al. (2007) examined what academic disseminators, industry professionals, doctoral students, and experienced academic researchers understand with “qualitative research.” They identified eight dimensions characterising qualitative research:

- verstehen
- verstehen but with reflexivity
- general bag of tools
- a specific bag of tools with a distinctive role and use in management research: accessing organizational back stages
- exploratory research with regard to little understood phenomena prior to other (i.e. quantitative) research
- disposal category
- research that is not quantitative
- specific data collection techniques

According to Mills (1959), a common characteristic for all qualitative research is that it does not dissociate the analysis from the researcher’s experience. Qualitative research is based on subjective interpretation of data, and it has become a widely used approach particularly in social sciences and management research. Research in natural sciences tends to rely on quantitative methods and have its ideal in pursuing objectivity. Still, it is argued that no science, natural or social, can do without subjectivity (Gummesson, 2001). Creativity and lateral thinking, generating new theory and basis

for propositions, is subjective. Next, two qualitative methods are discussed in more detail. They are interactive research and constructive method. These methods are used in our empirical study.

2.2 Interactive research

Interactive research method was introduced by Gummesson (2001, 38-41). This research approach is based on interaction and communication with chosen relevant audiences. It ties together the process of knowing, the knower, and the known. The approach is based on various kinds of interactions, such as interaction between the researcher and the object of study and its actors; between one's consciousness and qualities of one's inner self; between substantive data and general concepts; between the parts and the whole; between words, numbers, body language and tacit language; and concurrent, non-linear and dynamic interaction between data collection, analysis, interpretation and conclusions.

In the interactive research, theory generation and theory testing are inseparable twins, not isolated consecutive stages. Through further theory generation in never-ending iterations the researcher gains a spiralling effect and builds a helix of continued development of knowledge. The researcher goes from pre-understanding to understanding, to a new level of understanding, and so on; and from substantive, specific data to concepts that serve as vehicles for reaching more general theory levels. This approach is governed by a humanist, hermeneutic and phenomenological paradigm, although elements from a quantitative and positivistic paradigm may be included.

Interactive research is an umbrella for well-known research methods, which are characterized by the earlier qualities. Examples of such highly interactive methods are case study, grounded theory, anthropology/ethnography, action research, and narrative research. Case study recognizes complexity and ambiguity, grounded theory lets reality tell its story on its own terms, anthropology and ethnography allow the researcher to be where it happens, action research makes it happen with reflecting, and narrative research makes the reality to come alive (Gummesson, 2001).

2.3 Constructive method

The constructive method is a research procedure for developing constructions, where constructions refer to entities that solve problems that emerge in running business organizations (Kasanen et al., 1993). An important characteristic of constructions is that their usability can be demonstrated through implementation of the solution. Sometimes constructions refer to principal solutions only, as the testing of their usability is not always possible because of resource and time restrictions. The constructive research means, in other words, managerial problem solving through the construction of models, diagrams, plans, organizations, etc. Still, it should be noted that not all problem solving and model building exercises are constructive research. According to Oyegoke (2001), analytic model building produces an elegantly proven problem solution which works in principle but whose actual practical adequacy usually remains unclear. Kasanen et al. (1993) argue that, a construction which works, is relevant and simple and easy to use. An essential part of the constructive approach is to tie the problem and its solution with accumulated theoretical knowledge. In addition, the novelty and the actual working of the solution have to be demonstrated. The construction should include new knowledge to both to the business and academic community. The characteristics of a construction of solution to a problem are practical relevance, theory connection, practical functioning, and theoretical contribution.

According to Oyegoke (2001), the constructive approach encourages co-production of knowledge between the industry practitioner and the researcher. The constructive approach is a method that can be used to develop social interaction among people, illuminating the flux of events and human action within the array of social agenda, practices and stakeholder relations. Constructive researchers rely on interpretative method by assuming that people construct and test solutions based on their interaction with the world around them. According to Kasanen et al. (1993), the research process of a constructive approach includes the following phases. Their order may vary from case to case:

- (1) Finding a practically relevant problem which also has research potential
- (2) Obtaining a general and comprehensive understanding of the topic
- (3) Innovating i.e. constructing a solution idea,
- (4) Demonstrating that solution works,
- (5) Showing theoretical connections and the research contribution of the solution concept, and
- (6) Examining the scope and applicability of the solution.

3 Empirical research process

The research process of the present study is illustrated in Figure 1. The phases of the research process are shown in detail in Table 1. The study is based on interactive research approach (Gummesson, 2001) where the empirical data is generated in interaction with researchers and relevant actors in respect of the purpose of the study. The research is affected by the researchers' pre-understanding. The process is a continuous interplay between data from interaction, existing theories from the literature, and researchers' interpretation. A new theory is developed as a result of these interwoven elements.

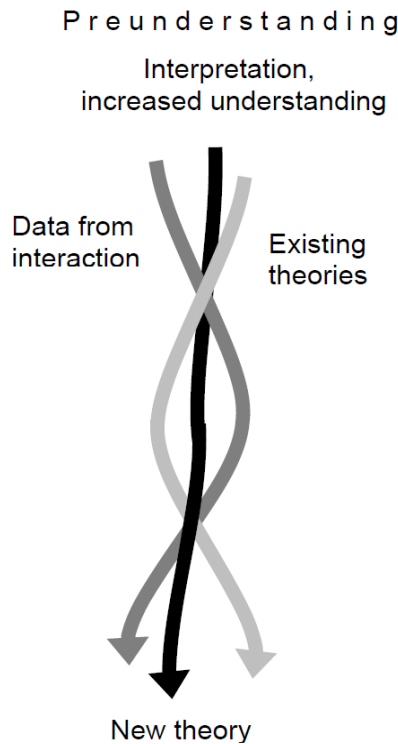


Figure 1. Interactive research process.

Pre-understanding refers to knowledge, insights, and experience of people before they engage in a research program or consulting assignment (Gummesson, 1991). It is also affected by the researcher's attitude and commitment. The preunderstanding of this study is based on the theories on service logic (e.g. Grönroos 2006 and 2008), service-dominant logic (e.g. Vargo; Lusch, 2004 and 2008), and customer-dominant logic (Heinonen et al. 2010; Voima et al., 2010). It is also based on work in developing business models in practice with companies, particularly with help of Osterwalder and Pigneur's (2010) business model canvas (BMC) as well as Johnson et al.'s (2008) business model framework. Based on the pre-understanding, the existing business model frameworks are too provider-centric and goods-dominant, and require further development and adaptation to service logic. The existing theories and literature used throughout the research process deal with service logic, SDL, CDL, business models, and service design.

The fundamental purpose of the current research is the same as the one of constructive research method (Kasanen et al., 1993). In other words, it aims to develop a construction that solves a problem that emerges in running a company. The construction in the current research is a revised version of Osterwalder and Pigneur's (2010) business model framework, Business Model Canvas. The modifications aim at increasing the service logic-orientation of the original BMC tool. The research process aimed at a relevant and simple and easy to use construction. The present study included all the six phases of constructive research process suggested by Kasanen et al. (1993). During the process the problem and its solution were tied with accumulated theoretical knowledge. In addition, the novelty and the actual working of the solution were demonstrated. The last phases of the process aimed at showing and testing that the developed construction included new to both to the business and academic communities.

Table 1. Phases of the research process.

Step	Interaction of the research process	Outcome	Actors	Phase of the constructive research method
1	Discovering the knowledge gap and need for research (11 Oct. 2012, 2 hours)	Appointed ideation workshop	12 researchers	(1) Finding a practically relevant problem which also has research potential.
2	Interactive ideation, brainstorming, and development workshop (16 Jan 2013, 4 hours)	Initial development ideas, Canvas version 0.1	15 researchers	(2) Obtaining a general and comprehensive understanding of the topic. (3) Innovating i.e. constructing a solution idea.
3	Interactive ideation, brainstorming, and development workshop (5 Mar 2013, 4 hours)	Canvas version 0.2	15 researchers	
4	Interactive ideation, brainstorming, and development workshop (29 Apr 2013, 3 hours)	Canvas version 0.3	13 researchers	

Step	Interaction of the research process	Outcome	Actors	Phase of the constructive research method
5	Interactive ideation, brainstorming, and development workshop (30 Aug 2013, 4 hours)	Canvas version 0.4	9 researchers and 1 practitioner	
6	Interactive ideation, brainstorming, and development workshop (15 Sep 2013, 3 hours)	Canvas version 0.5	6 researchers	
7	Rapid test ("lean launch") and further development of the SL-based business model canvas in 5 company cases (8 Nov 2013, 5 hours)	Canvas version 0.6	1 researcher and 22 practitioners B	(4) Demonstrating that solution works. (6) Examining the scope and applicability of the solution (3) Innovating i.e. constructing a solution idea.
8	Assignment given to 24 practitioners to test the SL- based business model canvas in their organizations (9 Nov 2013, 2 hours)		1 researcher and 24 practitioners B	(4) Demonstrating that solution works. (6) Examining the scope and applicability of the solution.
9	Interactive ideation, brainstorming, and development workshop (20 Nov, 2013, 3 hours)	Ideas for further development	6 researchers and 40 practitioners A	(3) Innovating i.e. constructing a solution idea. (6) Examining the scope and applicability of the solution.
10	Results and reflections from the 24 test cases of SL-based business model canvas (14 Dec 2013, 4 hours)	Ideas for further development	1 researcher and 24 practitioners B	(4) Demonstrating that solution works. (6) Examining the scope and applicability of the solution.
11	Further development of the canvas in interaction between 2 researchers, based on analysis of the data (generated in workshops and through testing) and understanding accumulated in the research process (incl. existing theories). Identification of the scientific contribution. Writing of research report (30 Sep 2013 – 28 Feb 2014)	Service Logic Business Model Canvas	2 researchers	(3) Innovating i.e. constructing a solution idea. (2) Obtaining a general and comprehensive understanding of the topic. (5) Showing theoretical connections and the research contribution of the solution concept.
12	Introduction of the finalized Service Logic Business Model Canvas for comments. Need to develop a light application version of the canvas. (7 May 2014, 2 hrs)	Ideas for finalizing the Canvas. Clear need to develop a light application version of the Canvas,	10 researchers, 7 practitioners A	(2) Obtaining a general and comprehensive understanding of the topic. (3) Innovating i.e. constructing a solution idea. (6) Examining the scope and applicability of the solution.
13	Development of light application version of Service Logic Business Model Canvas	First version of light application version	2 researchers	(3) Innovating i.e. constructing a solution idea. (5) Showing theoretical connections and the research contribution of the solution concept.
14	Testing the light application version of Service Logic Business Model Canvas (5 Jun 2014, 1 hr)	Ideas for further development of light application version	20 practitioners A, 1 researcher	(4) Demonstrating that solution works. (6) Examining the scope and applicability of the solution.
15	Finalization of the Canvas. Development of a light application version of the canvas.	Finalized light application version, finalized Service Logic Business Model Canvas and its application process	2 researchers	(3) Innovating i.e. constructing a solution idea. (2) Obtaining a general and comprehensive understanding of the topic. (5) Showing theoretical connections and the research contribution of the solution concept. (6) Examining the scope and applicability of the solution.

The initiation of the research process took place in an invitation based expert panel (Step 1) where 12 service researchers concluded that one of the most widely-spread business model frameworks, namely Osterwalder and Pigneur's (2010) Business Model Canvas, requires further development, particularly towards the principles of service logic. Most importantly, the researchers saw that the BMC is based on traditional provider-centered value-chain thinking where value is created inside a company through its activities and resources and then delivered to customers. For example, the terminology of BMC reflects the goods-dominant logic, for example the "Channels" block of the BMC describes how "value propositions are delivered to customers through communication, distribution, and sales channels" (see Osterwalder; Pigneur, 2010, 16). The BMC does not see customers as value creators, nor does it suggest how service could be embedded in customer's contexts, activities and experiences (cf. Heinonen et al., 2010).

The research process took 18 months and consisted of 15 steps (Table 1). The interaction in which data were generated and understanding increased consisted of ideation workshops. The process included twelve interactive workshops in which data from pre-understanding, interaction, interpretation and increased understanding, and existing theories were interwoven together. The research process was conducted in Finland and related to the activities of the Finnish Service Alliance. The other author of this paper planned the workshops beforehand and facilitated and documented them. The workshops were documented by writing notes during and after each workshop, by collecting all the raw material produced by the participants during the workshops (notes, writings, and drawings made by the participants), by taking photographs, and by recording the most important parts of the workshops. After each workshop, the business model canvas, which was the central researched object, was further developed based on the data and increased understanding generated in the interactive workshop. The actors of the workshops were researchers and practitioners. In this case, "researchers" include academic researchers from seven universities and other research related organizations. They were professors, senior researchers, doctoral students and coordinators of large national research programs. "Practitioners" refer to representatives from companies and other organizations (Group A). "Practitioners" also include master level adult students who conduct their studies alongside their full time job in companies and other organizations (Group B). 18 researchers and 106 practitioners participated in this process. Thus, altogether 124 persons were involved in the research process. The data were qualitative in nature, and its subjective interpretation took place during and after the interactive workshops both individually and collectively. In general, the emphasis shifted from theoretical thinking and model development towards practical model development and testing. The participants of the first workshops were mostly researchers (Steps 1-6) while the participants of the later workshops were mostly practitioners (Steps 7-10, 14).

The outcome of the empirical research process

As the outcome of the empirical research process, a new service design tool was developed, called Service Logic Business Model Canvas (Ojasalo; Ojasalo, 2014). The new canvas is a modified version of the original BMC and it has the following elements. Each element of the canvas is considered "from our point of view" and "from customer point of view." The elements are recommended to be developed in the following order, if there is no case-specific reason to develop the elements in some other order.

1. Customer's world and desire for ideal value
2. Value proposition
3. Value creation
4. Interaction and co-production
5. Revenue streams and metrics
6. Key resources
7. Key partners
8. Mobilizing resources and partners
9. Cost structure

The application of Service Logic Business Model Canvas includes three main phases:

1. Light application version of Service Logic Business Model Canvas
2. Information gathering and development work with selected service design methods
3. Full application version of Service Logic Business Model Canvas

The contributions of the research relate to four differences between the new canvas and the original Osterwalder and Pigneur's (2010) canvas. These contributions are explained in the following.

First, the developed Service Logic Business Model Canvas adapts the business model thinking to service logic. Each building block of the present canvas is adapted to service logic. The original Osterwalder and Pigneur's (2010) framework view the business from the provider viewpoint. The present framework has both the provider and customer viewpoints explicitly. When building a business model with help of the new framework, one has to consider how each element should be constructed and how they look like "from our point of view" and "from customer point of view". In this way, the present framework makes sure that the service logic is present in each phase and element in the business model development.

Second, the Service Logic Business Model Canvas is designed to be applied to each customer profile separately. The original Osterwalder and Pigneur's (2010) framework has the "Customer segments" element suggesting that the

other elements of the business model should be identical to each segment. This is often difficult or impossible while the characteristics of each segment may be very different. By using the framework individually to each relevant customer profile, it is possible to have a deep understanding of the customer logic and requirements of each profile. Consequently, in such a case the total business model may be a set of profile specific sub-models.

Third, the Service Logic Business Model Canvas gives a recommendation of the order in which the elements of a business model should be developed. The existing literature is contradictory when concerns the question, whether or not a business model's elements should be developed in certain order. Or should it start from certain defined element or activity? (cf. Johnson et al., 2008; Osterwalder; Pigneur, 2010). Our recommendation with the present framework is that the starting point should be in the block 1 describing the customer's world and then follow the given order. However, if there is case-specific reason to develop the elements of the business model in some other order, then we recommend following that order. Anyway, the process is likely to be iterative rather than straightforward (Demil; Lecocq, 2010, Kindström; Kowalkowski, 2014).

Fourth, the use of Service Logic Business Model Canvas includes both light and full application version. The business model development starts with light application version. The second phase includes information gathering and development work with selected service design methods. Based on this effort, a full version application of the framework is conducted, which results in possibly several detailed business models, one each targeted customer profile. In some cases the light application version may be the only effort, for example when there is no time for full version application or when there is not enough resources for research and development work.

4 Result: Evaluation of the usability of the interactive research and constructive method

Next, we evaluate the usability of the interactive research and constructive method in adapting business model thinking to service logic. The evaluation is based on our own experience and interpretations throughout the research process. Based on this, the above research methods have the following advantages and challenges.

4.1 Advantages

The advantages of the interactive research and constructive method were

1. Multidisciplinary and cross-industry research collaboration
2. High motivation and commitment of parties to research project
3. Rich data, innovative new ideas
4. Continuous critique of findings and ideas
5. Gradual build-up, validation and triangulation of the findings and theory

A clear advantage of the methods used was the **research collaboration of people from different backgrounds**. The people involved both practitioners and academics. Practitioners came from various industries and responsibilities, thus allowing a large spectrum experience, knowledge and opinions to be shared on service business during the research process. Also, the academics came from different universities and research organization with varying research backgrounds and interests. This diversity of participants involved in the research process made possible to learn from others and develop and test own ideas. As a consequence, they were highly **motivated to** commit themselves to the research process. Moreover, the diverse backgrounds of participants resulted in **extremely rich data**. This enabled new exploratory findings, development ideas, and interpretations which would have been unlikely to be found with other research methods.

Another advantage of the method was the **continuous critique of findings and ideas** that emerged during the process. Participants gave immediate critique if someone made an interpretation they did not agree. The data were also analysed between the interactive workshops, and the findings from previous workshops were discussed and criticized in the next workshop. They were criticized by both academics and practitioners. As the theory and the new ideas were built up gradually under continuous critique, they were also **validated** much more strongly than many academic theories. As the critique and comments for improvement came from practitioners from several industries as well as multidisciplinary group of academics, the theory was also effectively **triangulated**. The continuous critique and evaluation of findings increased the quality of the research.

4.2 Challenges

The challenges of the interactive research and constructive method were

1. Effort and time for organizing the research process
2. Discrepancy in communication and use of terminology between participants
3. Dealing with abstract theories with practitioners

Effort and time required to organize the research process represented a clear challenge. Our research required a longer time to refine the theory in an iterative stepwise process, 18 months. Scheduling the workshops was not easy

because of the number of participants. Also, documenting the discussions, notes and graphical illustration from workshops required substantial effort.

One challenge in working with participants with heterogeneous backgrounds related to **discrepancy in communication and use of terminology**. The difference was observable particularly between practitioners and academics. Academics used more accurate language and wanted to maintain conceptual clarity. Practitioners, on the other hand, tended to express their ideas more loosely and inaccurately. This caused some challenges for discussion and theory development.

Our research aimed at adapting business model thinking to service logic. Service-based business logics (Vargo; Lusch, 2004; Heinonen et al., 2010, Grönroos, 2011) are scientific theories and consequently rather abstract for many practitioners. **Explaining their principles to practitioners and bringing them down to a concrete level** was a challenge during the research process.

5 Conclusions

The purpose of this paper was to increase the knowledge of application of interactive research and constructive method in adapting business model thinking to service logic. The paper explained how these empirical research methods were applied in the development of Service Logic Business Model Canvas, and evaluated their usability. As a result, it found out that the advantages related to multidisciplinary and cross-industry research collaboration, high motivation and commitment of parties to research project, rich data, innovative new ideas, continuous critique of findings and ideas, as well as gradual build-up, validation and triangulation of the findings and theory. Challenges on the other hand, were effort and time required for organizing the research process, discrepancy in communication and use of terminology between participants, and dealing with abstract theories with practitioners.

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Beyond customer solutions – materials producer facilitating value co-creation in industrial networks

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The manufacturing companies are trying to avoid the effects of increasing competition and commoditization of their businesses by shifting their focus to customized solutions and customer relationships. However, the management of the relational processes is becoming challenging, as the companies lack the required capabilities and resources to master the solution provision alone. This means that the customer relationships must be exposed to other actors which compromises supplier-customer relationship based competitive advantage.

Therefore, in line with the developments of the strategic management research, the solution network literature is suggesting that the manufacturers should look beyond the dyadic relationships when seeking to establish competitive advantage. The increasing specialization of actors and growing need of complementarities may open potential for new modes of operation, extending beyond traditional solution-oriented business models. The theory seems to propose that the network approach may make it possible to reach a new kind of service-enabled competitive advantage, originating from the network structures that firms are able to control. However, these approaches been analyzed only anecdotally in current literature.

Based on an empirical case study involving a large materials producer company in construction industry, and multiple supplementary case companies in the same network, we suggest that along solution providers, solution networks need also actors who facilitate the development of the networks, integration of resources, communication between the actors, and organization of the operations. In this setting the firm is not developing its own service and offering, but instead provides a platform that helps other firms to develop solutions and enables customers to find and utilize them efficiently. With this approach the “solution platform provider” is able to use its network as a source of competitive advantage. Furthermore, this mode of operation may actually transform a physical material producer – for which the movement towards service and solution business has been challenging – into facilitator of industrial ecosystem.

1 Introduction

The research stream of manufacturers' servitization and service infusion (Vandermerwe & Rada, 1988; Wise & Baumgartner, 1999) describes how manufacturing companies are trying to avoid the effects of hypercompetition (i.e., rapid and dynamic competition characterized by unsustainable advantage) and the commoditization of their businesses by shifting their focus to customer relationships. In the discourse, instead of unique products or processes, the relational process between the supplier and customer, i.e. solutions (Gebauer, Gustafsson, & Witell, 2011; Gebauer, 2008; Kindström & Kowalkowski, 2009; Mathieu, 2001; Neu & Brown, 2005) is seen as the fundamental building block for the sustainable competitive advantage and the antidote to hypercompetition.

However, recent developments in the service infusion discussion argue, that the management of the relational process itself is becoming more challenging, as the companies lack the required capabilities and resources to master the solution provision by themselves. Therefore, in the manufacturing context, the solutions are increasingly delivered in service and solution networks (e.g. Henneberg et al., 2013, Gebauer et. al 2013), in which actors share resources and capabilities in order to produce the best possible solution for their customers. Thus, in order to deliver the solutions, co-operation and resource integration is needed with potential competitors in the same industry. This means that the customer relationships, and most importantly the cumulative history underlying those relationships, must be at least partly exposed to other actors, which then compromises the longer-term protection of the competitive advantage.

Therefore, in line with the developments of the strategic management research (Adner & Kapoor, 2010; Iansiti & Levien, 2004; Moore, 1993; Teece, 2007), the solution network literature is suggesting that the manufacturers should look beyond the dyadic relationships when seeking to establish competitive advantage (Bastl et al., 2012; Barquet et al., 2013, Gebauer et. al 2013; Kowalkowski et. al 2013). Especially efficient management of industrial networks could generate beneficial results. The increasing specialization of actors and growing need of complementarities may open potential for new modes of operation, extending beyond traditional solution-oriented business models.

This suggests, that along solution providers, solution networks need actors that facilitate the development of the networks (e.g., bridging structural holes), integration of resources, communication between the actors, and organization of the operations. In this setting the firm is not developing its own service offering, but instead provides an environment

(building blocks, infrastructure, etc.) that helps other firms to develop solutions and enables customers to utilize these solutions. It appears that there is a clear need for more detailed contributions in this area as, most interestingly, these new roles might be especially appealing to the firms which have found it difficult to establish close enough contact with the end customer, develop solution offerings, and thereby also comprehensively “servitize” their offerings. Current service infusion literature states that this seems to be the case especially in the upstream actors of the industrial networks – the actors who seem particularly vulnerable to the effects of hypercompetition (Thomas & D’Avenie, 2009).

Furthermore, the rapid developments in the field of manufacturing-related information availability and sharing (managerially discussed, e.g., using terms such as the “Internet-of-things” (e.g. Atzori et al., 2010) and “industrial Internet” (Evans & Annunziata, 2012) may speed up the development toward even more complex industrial networks, calling for new ways of managing the solution networks – and also potentially providing strong strategic benefits for companies mastering the capabilities of orchestrating these networks.

ICT and high-tech industries have managed effectively orchestrate agile service networks (Bourdea & Lakhani, 2009). Also these industries have encountered resource and capability fragmentation and the complexity of the management of industrial networks. In these industries, there has been industry restructuring, which has created new business potential and new roles in industrial networks. The companies have successfully adopted so called platform-typed business models, in which firms create foundations or components on top of which other firms in the ecosystem then build customized solutions (Baldvin & Woodard, 2009). In these networks, the companies develop complex relationships between many parties in their networks and are thereby able to build competitive advantage.

Therefore, we take the concept of platform as a theoretical lens and explore what kind of possibilities upstream actors have in manufacturing related solution networks regarding sources of competitive advantage. The platform literature suggests that platforms are often formed around solving systemic problems of fragmented industries (Gawer & Henderson, 2007). Therefore, in order to elaborate the possibilities that the platforms concept could offer in terms of gaining competitive advantage via network orchestration, our research questions are as follows: “What are the systemic problems in the construction industry? How can a servitizing manufacturer build competitive advantage with platforms in the manufacturer’s service and solution provision context?” The questions are addressed with an empirical study of an upstream material manufacturer in the construction industry developing new platform-based modes of operation. The data gathered from this main case is supplemented by secondary data from other companies in the construction industry. With this data, the potential of platform-based business models is analyzed from the perspective of competitive advantage.

2 Theoretical background

In this study we are elaborating the competitive advantage the manufacturing firms can achieve by orchestrating the service and solution networks with a platform strategies. To establish the theoretical ground for our study, *we will review the theories of gaining competitive advantage in highly competitive (hypercompetitive) environments, with special focus in manufacturing industries. Then, we will link the strategic discussion to the literature on manufacturer’s servitization, which is describing the manufacturing industry’s answer to the hypercompetitive developments in detail. Finally, to form a ground for the theoretical lens of this study, we will review the platform discussion – first in the more general level, and then, with the special focus on manufacturers’ service infusion context.*

2.1 Hypercompetitive environment and the manufacturing industry

Recent theoretical research indicates that many industries have become hypercompetitive, which has led shifting towards more temporary advantages as well as increasing structural instability (Thomas & D’Avenie, 2009). D’Aveni et al. (1994) defined hypercompetitive industry as ‘characterized by intense and rapid competitive moves, in which competitors must move quickly to build advantage and erode the advantage of their rivals’. The literature indicates that bold, frequent and aggressive competitive moves of rivals create a condition of constant disequilibrium and change (D’Aveni et al., 1994). This sort of competitive environment increases possibilities of challengers rapidly to overtake the leaders even without their notice (Smith, Ferrier, and Grimm, 2001).

Strategy literature has argued and empirically verified that hypercompetitive environment restricts the strategic choices that firm can make (D’Aveni et al., 2010; Eisenhardt & Bourgeois, 1988; Eisenhardt, 1989). This means that different types of strategies seem to be successful in dynamic and stable environments. In addition, the phenomenon is not limited to some specific (e.g. high-technology) industries but can be seen across a broad range of industries (Wiggins & Ruefli, 2005). Thus, although skeptics have proposed that the term hypercompetition is ‘a self-inflicted wound, not the inevitable outcome of a changing paradigm of competition’ (Porter, 1996), it seems that in many industries the sustainable competitive advantage is increasingly hard to achieve, and firms need to alter their strategies to avoid commoditization.

The manufacturing industry has also been affected by the development toward hypercompetition (Thomas, 1996) and the companies are looking for ways to prevent the competitive dynamics from escalating to perfect competition. Industrial manufacturers are striving away from product-based businesses towards customized services and result-driven solutions – i.e. building competitive advantage on customer relationships, and thereby developing “antidote for hypercompetition”.

2.2 Movement towards relationships, services and solutions in the manufacturing industry

The manufacturing industry's movement towards customers is extensively discussed in manufacturers' servitization and service infusion literature (e.g. Baines et al., 2009; Vandermerwe and Rada, 1988). From the strategic perspective, the discussion has followed the paths directed by strategic management scholars, both trying to intensively explore the sources of competitive advantage and its sustainability (Barney, 1991; Dyer & Singh, 1998; Eisenhardt, 1989b; Porter, 1980; Richard A. D'Aveni, Giovanni Battista Dagnino, & Ken G. Smith, 2010; Rumelt, 1984; Teece, Pisano, & Shuen, 1997; Teece, 2007; Wernerfelt, 1984). Throughout the service infusion discussion, the role of the dyadic relationship between the supplier and customer has been emphasized. According to the discussion, customer relationships create the most value and offer an inimitable resource for the company, protecting from fierce competition. It is even argued that all manufacturers must become solution providers, and the dynamic capabilities of relationship management are the necessities for competitive advantage.

However, in recent service infusion discourse, the network perspective to service management has challenged the firm boundaries in dyadic relationships. The services are increasingly innovated and provisioned in inter-firm networks. Thus, the relationships between suppliers and customers are in many cases shared, as well as related capabilities and resources. Therefore, most recent studies of service infusion strategies have shifted the focus towards gaining competitive advantage from inter-organizational relationships and networks. Service infusion scholars also adhere to the later themes of strategy stream focusing on the role of systems perspective, emphasizing the connections between the firm and the ecosystem (Adner & Kapoor, 2010; Iansiti & Levien, 2004; Moore, 1993; Teece, 2007) it occupies. Moreover, the latest service infusion literature seeks competitive advantage from new, value-enhancing combinations of actors (Bastl, Johnson, Lightfoot, & Evans, 2012; Gebauer, Paiola, & Saccani, 2013; Kowalkowski, Witell, & Gustafsson, 2013), as well as the dynamic capability of network orchestration.

2.3 Platforms, and their applications in manufacturer's service and solution business context

Platforms have many different definitions depending on the age and context. Over the last decades platform literature has shifted the focus from the context of physical products into abstract business environments and platforms are considered to provide the base of core components in which different actors can provide complements and increase collective value of platform. Platform is referred as a system, which solves systemic problems of ecosystems by technological element. For example, Gawer & Henderson (2007) described platforms as:

"... define a product as a platform, when it is one component or subsystem of an evolving technological system, when it is strongly functionally interdependent with most of the other components of this system, and when the end-user demand is for the overall system, so that there is no demand for components when they are isolated from the overall system"

Platform has been proven suitable operation model in hypercompetitive environments, especially when companies are trying to take steps towards service business (Chesbrough 2011). Platforms provide a practical and effective structure for the different actors of the business ecosystem to be involved with the value creation (Iansiti & Levien, 2004). It is notable that the value is not captured only by the owner of the platform. Instead, even end-users may participate in a process of value co-creation and benefit from it. The success of the ecosystem is dependent of how value networks are created and extended. Thus, platform ecosystem is very volatile: it either rises fast or dies quickly.

Taking the service and solution business perspective, according to Nishino *et al.* (2012) platform-type service system provides a bundle of multiple products and services, which is sold to end-users. (Eisenmann, Parker, & Van Alstyne, 2008). Platform offers a solution to drastically changing business systems in the age of new technology and open information. In traditional business approach value is created at upstream and consumed downstream, where as in platform allows users to create and consume value. To simplify, platforms provides three new perspectives to business:

- Understanding how new technology and information change business ecosystem over time
- Allowing and encouraging users to create and consume value
- Enabling creation of transactions without the need of more resources

Platforms seems to provide advantages when the system is complex but its requirements are heterogeneous, future technological developments are uncertain and the system must adapt to unanticipated environmental changes (Sawhney, 1998). In hypercompetitive environment platform-type service or solution systems provide security since a large network of organizations addresses the rapid technological changes. Also, the external innovators that platforms provide can increase the value of product significantly. Companies usually struggle to open their product development to external world but in a platform-type service system the owner of the platform is able to combine the innovativeness created by freedom (Boudreau & Lakhani, 2009) and a control to orchestrate network operators (Gebauer et al. 2013).

In manufacturers' service infusion literature platforms are often referred as ICT environments, which combine both technological infrastructure and opportunities for service delivery (Brax & Jonsson, 2009). However, the concept of platform has been also used in the context of service modularization (Pekkarinen and Ulkuniemi, 2008). In addition,

platforms have been seen as a way to link, cooperate and innovate new services (Palo and Tähtinen 2011, Den Hertog et al. 2010). In addition, the most recent discussions (Gebauer et al., 2013; Lay et al., 2013) have suggested that service networks could be orchestrated by platforms, and some firms might be able to coordinate these platforms. However, due to the diversity of the terminology, a more detailed view on the role of platforms in creating sustainable competitive advantage for the industrial manufacturers has not been formed.

3 Methodology

The research uses case study methodology from Yin (2009) as it suits empirically novel research problems well (Eisenhardt, 1989a). The case study method has proven to be effective in unexplored and original research problems. It allows researchers to discover and theorize phenomena that are not conceptually understood (Eisenhardt, 1989a). The disadvantage of the method originates from the difficulty in judging if the results of the study apply to more general contexts.

3.1 Case selection and data collection

Case companies were selected according to the criterion of supporting our theoretical suggestion that the orchestration of industrial networks possesses untapped potential for manufacturing. The primary case company, called MaterialCo, is a large materials producer firm with large-scale global operations in the construction industry. The firm is considering the possibilities to gain sustainable competitive advantage from service and solution networks, and is planning to use platform business models in building the network utilization approaches. The companies for the complementary cases were selected to provide a comparative perspective that could be used to deepen our analysis of MaterialCo's case and reveal more information about different approaches. All complementary firms have already established platform business in industrial services but are currently operating on a much smaller scale than MaterialCo.

Data collection and analysis were executed over a three-month period in 2014. The research was conducted in five stages. We began the study by performing an extensive bibliographic review of multiple topics in the platform literature across servitization, service infusion as well as strategic management. The second stage comprised sixteen initial interviews with participants from three companies from the upstream construction networks, including MaterialCo. The interviews were conducted with members of various levels of the case organizations, including senior executives, product managers, salespersons, factory managers, and industry experts. All the interviews were conducted during face-to-face sessions that were tape-recorded and transcribed. Each interview lasted an average of one and a half hours (ranging from 45 minutes to two hours). We used thematic coding for analyzing the contents of the interviews (Gibbs, 2008; Miles & Huberman, 1994). Interviews were continued until the point of saturation was reached where unnecessary information began to appear frequently (Corbin & Strauss, 2007).

In a third phase we validated the collected insights from interviews with some of the informants. After the preliminary findings from the MaterialCo case, we concentrated on the complementary cases, which consisted of several relatively new companies that operate in the construction business. Companies were analyzed based on public information, such as websites, articles, and business journals. During the fifth stage key findings of the study were discussed with experts from MaterialCo to verify and further elaborate the findings.

3.2 Data Analysis

After the information was collected from interviews and data transcription was carried out. The process proceeded as follows:

- Reading through the transcriptions in order to obtain a good overview of the material.
- Determining the categorization and coding.
- Coding a few interviews with chosen criteria.
- Re-evaluating the categories again to match the answers provided by the interviewees
- Coding the rest of the material.

Data analysis was executed manually by converting the data to separate areas. Finally, the analysis included follow-up discussions to help verify and calibrate the findings.

3.3 Trustworthiness, credibility and reliability of findings

To assess the trustworthiness, credibility, and reliability of the findings, this research study employed multiple approaches based on established procedures adopted from the literature (e.g., Yin, 2009). Involving experts and key informants to review the data and analysis provides a strong basis for the process. Also, multiple perspectives help to determine saturation. The criteria of fit, understanding, generality, control, credibility, transferability, dependability, confirmability, and integrity is shown in Table 1 (Flint et al. 2002; Storbacka 2011).

Table 1. Assessing the reliability and validity of the study.

Criteria	Explanation	Method of assessing in this study
Credibility	Extent to which the results appear to be acceptable representations of the data	Three months conducting interviews in the field; preliminary results were discussed and verified with key informants
Transferability	Extent to which findings from one study in one context will apply to other contexts	Sampling across different positions and business lines within one organization; multiple smaller examples confirming the findings from the main case
Dependability	Extent to which the findings are unique to time and place; the stability or consistency of explanations	Strong interest toward internet-of-things related business models at the time of the study may bias results
Confirmability	Extent to which interpretations are the result of the participants and the phenomenon as opposed to researcher biases	Results were audited by several key stakeholders and experts
Integrity	Extent to which interpretations are influenced by misinformation or evasions by participants	Interviews were professional and anonymous
Fit	Extent to which findings fit with the substantive area under investigation	Case selection was conducted carefully to give a complete picture of the area of interest
Understanding	Extent to which participants buy into results as possible representations of their worlds	The key interviewees were offered preliminary findings and asked to comment on and verify their accuracy
Generality	Extent to which findings discover multiple aspects of the phenomenon	Interviews were long and open to capture the insights from a broader perspective. Interviewees were chosen to capture all the viewpoints of the topic
Control	Extent to which organizations can influence aspects of the theory	Participants had an opportunity to refine the theoretical suggestions

3.4 Case descriptions

3.4.1 Case MaterialCo: seeking competitive advantage in hypercompetitive environment

MaterialCo is a material and component producer for the construction industry. Due to increasing competition, the company has been strongly challenged in simple and inexpensive materials. The high manufacturing costs cause difficulties for MaterialCo to match the current price level set by companies from developing countries. The company has invested heavily in R&D and has launched a new type of construction material as well as the production process required to manufacture it. The material provides features that make it possible for use in building innovative structures with contemporary architectural and design characteristics. However, according to the case evidence, the characteristics of the material lose signification after a certain level; with MaterialCo's product, this "good enough" level is relatively easy to accomplish.

After a certain point, the quality or the product itself does not provide any advantage. – Director, MaterialCo

It seems challenging for the MaterialCo to build long-term competitive advantage with its products or the production process itself. Nonetheless, the company is willing to develop the construction materials to a more advanced level, and thereby differentiate the product. However, MaterialCo has realized that the product development will only provide short-term advantage. The informants agree that even if MaterialCo is able to build completely new products with superior characteristics, the competitors are able to overcome the quality gap in a relatively short time period. This is because the regulation and practices of the construction industry make it challenging to make new materials inimitable.

In the construction business you can't protect your product with patents. If you do so, the customers are afraid to buy materials without real competition between producers even if the product is better. – Director, MaterialCo

Thus, a longer-term advantage must be found elsewhere. Resource-based strategies offering processes to produce differentiated products and effective materials seem not sufficient. Therefore, the company is seeking competitive advantage from the solutions and services around the materials. Unfortunately, the construction business creates limited possibilities for MaterialCo to build dyadic relationships in the supply network, through since it is cost-effective for

investors and construction companies to let material producers compete with each other to lower the price. The different actors often optimize their own earnings without optimization for the best overall solution, which seems to prevent strong relationships to emerge especially upstream.

The construction business is local, fragmented. It doesn't provide the best overall solutions for users or buyers. Different operators are optimizing their own benefits, and in order to break the current situation, you need to shake the flow of the building process. – Vice President, MaterialCo

According to the case evidence, it is very difficult to answer to this challenge. However, MaterialCo is planning to create a new kind of collaboration around their new products by utilizing a platform approach in service and solution network orchestration. The goal is to solve the systemic problems of the construction industry and operate as an “enabler” between different actors of the network. By increasing the lifetime value of the final product and positioning itself in a central position in the solution network, MaterialCo believes that it will be able to enable longer customer relationships with the key players of the network.

3.4.2 Complementary cases: utilizing the development of ICT and available customer information

The complementary cases represent the same operational environment but from a different angle. While the construction industry is considered a conservative business where changes take a lot of time, the development of ICT and smart buildings have created dynamic networks of solution providers to the downstream of the construction business in a short amount of time. New solution providers have been able to involve end-users in value creation and rapidly increase the utility value of buildings.

Five years ago the construction business was about how good of a plot you can get and how well you build your building. But five years from now it will be about how well you handle and coordinate building information during and after the building phase. – Account Manager, Supplementary Case Company

We analyzed twelve companies that have successfully managed to make an entry into the construction value network. The biggest factor behind the success of these companies has been the utilization of customer information, such as energy consumption and humidity. The development of ICT-systems and sensing of physical artifacts (related to buildings) has allowed new actors to gain access to once hard-to-gather or proprietary information at a tolerable cost. This has created networks where some companies enable access to the data and some companies build customer solutions based on gathered information.

In the context of the complementary cases, it is *noteworthy that the mere access to customers' information was once used as a source of competitive advantage, which afforded the supplier of a product or system (buildings in this case) a better position than its competitors*. However, the protection customers' information seems no longer provides a competitive advantage.

A summary of supplementary case companies is presented below in Table 2. Table includes business areas, offerings and annual revenues of the companies.

Table 2. List of companies.

Firm	Business	Offering	Sales
Company A	Electricity control	Devices, software and services that enable smarter and easier energy consumption	11K
Company B	Building system maintenance and industrial services	Automation and energy consumption, maintenance solutions for buildings	2,5Mrd
Company C	Data acquisition from sensing devices	Embedded control systems, smart building, building automation, data acquisition from vehicles	214K
Company D	Energy consumption	Solutions for energy-efficient property management and access to the global online service	391K
Company E	Air handling and heat recovery systems	Solutions and systems for fresh and clean indoor air	12M
Company F	Security solutions for physical places	Solutions for security technology, door automatics, locking, and time and attendance systems	32M
Company G	Energy efficiency in buildings	Estimations and designs of building service systems before construction phase, management of maintenance	24M

Firm	Business	Offering	Sales
Company H	Provide user interfaces for sensor data	Provide user-interfaces and data warehouse services to sensor data	92K
Company I	Energy efficiency	Solutions and services around wireless sensors	132K
Company J	Develop tools for monitoring production processes	High-tech products and services for online monitoring and imaging of high temperature processes	-
Company K	Software technology for the Internet of things	Smart homes, remote control of energy consumption, lighting control	217K
Company L	Energy efficiency	Real-time energy monitoring for different houses	217K

4 Findings

Due to the exploratory design of this research, a detailed illustration of the case findings is required. In this section, the findings related to the two research questions are described and analyzed thoroughly. First we take a look for systemic problems in construction industry. Then, we present how manufacturers utilizing platforms could solve the problems and how the providers of platforms could benefit from situation.

4.1 Systemic problems of the construction industry

4.1.1 New information-driven business models require more integration

According to the cases, the information regarding the construction outcomes (buildings) and their users has become a foundation for new business models, facilitating the entrance of new companies to the construction market. These new actors focus both on the development phase of the building and the maintenance period that has received less attention in the past.

Online information is coming and sensors will provide more and more data. It will change the construction business. – Senior Vice President, MaterialCo

You need goals that extend throughout the life cycle. – Vice President, Technology and Product, MaterialCo

The data reveals that the new entrants are innovating and providing new services that mainly target the end user process development and optimization. In the core of these new business models is allowing end users to access information (e.g. regarding energy consumption), and providing analytical tools and applied solutions based on the insights that the provider and customer acquire together. What seems to be common is that most of them are combining different (and novel) information sources, such as weather forecasts, electricity consumption, and even location services. Most importantly, the informants agree that while the information retrieval issues (such as adding sensors to the building and combining data from multiple sources) currently do not pose severe issues that would inhibit the development of the new business models, it would be most cost-efficient to implement data-gathering tools during the installation of the building. However, none of the smaller companies included in our sample had the opportunity to influence the building construction to make this happen.

Many operators have an interest to collect data from the building process and there should be some universal ways to do it. At least at some point there will be. – Account Manager, Supplementary Case Company

Systemic problem 1: While the role of customer information is rising in the business models of construction industry, the lack of technical integration between different actors providing this information is inhibiting the solution innovation and business model development

4.1.2 ICT-tools restrict the innovation in the upstream of the value network

According to the informants, the importance of ICT has increased constantly over the last decades in the construction industry. For example, majority of building projects gather information to common interactive building infrastructure modeling tool (BIM) throughout different phases of the construction process starting from designing till actual building stage. While at the moment ICT is considered to be just in a supportive role in construction it is possible that in a future the actual building has significantly less important role in construction projects.

Information models are not utilized yet in the maintenance process but it will be used in next few years. – Software Technology Manager, Supplementary Case Company

Five years ago construction business was about how good plot you can get and well do you build your building. But five years from now it will be how well you handle and coordinate building information during and after the building phase. – Account Manager, Supplementary Case Company

However, especially new products are difficult to implement in mainstream BIM systems. It seems that the ICT tool development, although being crucial, does only seldom lead to dominating positions in the industry networks. The lock in to current ICT solutions, such as BIM software seems to be so high that new entrants find it challenging to take over larger parts of the construction process. As the one of the informant from supplementary case company stated: “The switching cost for BIM is so high that I doubt our company would even consider changing it.”

Systemic problem 2: While ICT-tools have enhanced the construction process significantly over the recent years, they still just optimize existing (conservative) processes and procedures. The innovation in the upstream of the value network is thereby restricted.

4.1.3 There are problems in resource-efficiency

Based on the evidence, it appears that the fragmentation and suboptimization of the industry is at least partly inhibiting the efficiency of the industry-wide processes, as well as the value creation opportunities for all stakeholders and the overall quality of the end products. Currently, the fragmented construction industry does not provide the best overall solutions for investors, which often increases costs during the maintenance phase. However, there seems to be large interest in utilizing the development of ICT and “smart” products (or in this case smart buildings) to solve the resource-efficiency issues. By “smartness” the informants refer to the ability of the buildings and construction components to transmit information about wear and tear, analytically planning the maintenance operations, and also developing better quality products. For example, major renovations, such as plumbing projects, can be executed far less expensively when construction companies or designers leverage existing building infrastructure modeling as well as building usage information. Especially for the material producers, this information decreases the logistics cost and makes it possible to supply materials just in time.

Naturally there is an enormous amount of data and information inside ICT systems. We should build some kind of tools to process it. When analyzed, the results would be incredibly valuable for business. – Director, MaterialCo

Anyone who holds the information about the building has significant advantage over the other competitors when you need to repair or install new things in the building. – Software Technology Manager, Supplementary Case Company

At the moment, there is no party that could naturally assume the role of generating the “big picture” that is needed to develop smart buildings further. Investors and other operators do not want to commit to just one party providing the prerequisites for “smartness.” In addition, especially the investors seem to be more interested in construction process optimization than the building lifetime value development. Due to these reasons, no party has been able to fully utilize secondary markets that actually provide even more turnover than the manufacture phase of the building. The developers, architects, designers, investors, and construction companies themselves also focus just on optimization of their own parts of the process. The BIM providers, described earlier, have managed to enter the market by binding different actors together with common design models in the development phase of the buildings. But again, the maintenance phase of the building continues to receive very little or no attention.

It is easier to make a development with the investor and commit it to process than it is with the operator who does the construction. – Product Group Manager, MaterialCo

Investors are increasingly interested about information modeling, but usually they are not exactly sure what they really need. – Account Manager, Supplementary Case Company

It is difficult get our hands in the secondary markets. We haven’t found the way to do so yet. – Senior Vice President, MaterialCo

However, there still seems to be potential to take a resource-orchestrating role in the construction industry. According to the case evidence, the problem of resource efficiency may become more and more visible in the future, particularly as the buildings and the construction process produce increasing amounts of data that 1) shows the problems to the end users paying the final invoices and 2) slowly reveals the possibilities for improvement. For example, as the building information models become more detailed and sophisticated, new possibilities are revealed when other types of “smart building” data is combined in the models. The position of industry orchestrator is open to a party who can 1) gather data; 2) bridge structural holes in the construction industry inhibiting the resource efficiency; and 3) show the benefits to the users and the investors of the buildings.

Systemic problem 3: The construction industry is affected by suboptimization and opportunism of individual actors. ICT is providing tools to increase the resource efficiency (e.g. with smart buildings) and creating opportunities for new business especially in the maintenance phase of buildings. However, this requires resource-orchestration among many actors of the construction industry, and no actor has been so far able to take the orchestrator role.

4.2 Opportunities for platform providers

In this section we answer to the second research question, and present three types of platform models than can, according to the evidence and theory, provide potential sources of competitive advantage for the manufacturers in the construction industry.

In line with the theoretical reasoning presented in the first sections of this paper, the findings seem to suggest that it might be possible for the industrial manufacturers to base their competitive advantage on effective management of industrial networks and ecosystems. Building on the identification of the systemic problems of the construction industry, three modes of operation are identified. These findings reveal how a so-called solution platform approach may concretely extend the possibilities for the servitizing manufacturer, especially in the upstream of the value chain, and provide new sources of sustainable competitive advantage in a dynamic and networked environment. Three, platform-based operation modes are described next.

4.2.1 Resource-optimization intermediary platform

The first option, acting as a resource optimization intermediary, would leverage the material producers' central position in the industry by synchronizing the actors' operations, making the resource slack (identified in systemic problems) visible, and optimizing the resource usage among different actors. In practice, this may mean analytical and design tools, as well as tools that help co-operation between different actors. The possibility to deliver these tools is enabled by the cumulative and real-time information gathered by the sensing technology that is included in the construction material itself. From the strategic perspective, the company is helping the networked actors to enhance the valuability of their resources and to identify new resources and resource slacks. The sustainable competitive advantage is built on the dynamic process of gathering knowledge about the potential optimization possibilities of the network.

4.2.2 Platform for resource and actor combinations

The second option, based on the formation of new resource and capability combinations, would intelligently combine the service innovation and provision together. With this mode, the materials provider would not be just optimizing the current actor network and making it more effective. Instead, the firm would form an innovation platform, on which actors can meet and form new innovations by combining their resources and capabilities. More concretely, the material producer would give access to the ready-made smart technologies included in the construction material and facilitates open innovation of the construction ecosystem. The materials producers could also develop the pilot solutions on their own, thereby acting as a catalyst for the innovation.

4.2.3 Industry restructuration platform

The third mode of operation is then more about restructuring the construction ecosystem itself. With the help of information that the smart construction materials are able to gather and the analytical tools with which this information can be processed, the material producer could identify the structure of the construction ecosystem itself, information asymmetries, and even potential opportunities. By providing access to the information and analytical tools, the company could develop a dynamic capability of sensing, seizing, and reconfiguring the social network of the different actors and their resources in the industry. Reflecting the theories of strategic management, this might provide the materials producer with an agile and sustainable source of competitive advantage.

5 Concluding discussion

There has been an emerging interest towards network approach in the manufacturers' service infusion literature. This discourse has indicated a clear need to develop strategies around the network approach that help the manufacturing industry differentiate and overcome increased competition. However, consensus on how this should be done has not been formed. The present study aimed to deepen the current understanding of manufacturers' abilities to gain competitive advantage in the hypercompetitive environment. Our analysis states that leveraging solution networks have the ability to provide competitive advantage, while platforms might to be an effective tool to gain it. Furthermore, our study indicates that especially upstream actors should, instead of developing own solution offerings, consider developing so called solution platforms that provide prerequisites for solution provision for the actor network, and bind number of solution providers together. In other words, the upstream actors should analyze how their business could be a platform for other firms efforts in the same industrial network.

To further elaborate these directions, we have suggested three different modes for manufacturers to solve the systemic problems in the industry. The three modes are: 1) resource-optimization intermediary platform, 2) platform for resource and actor combinations and 3) industry restructuration platform. It appears that all these modes of operation are practically information-driven. In the modes, the upstream actor perceives the physical object almost as a side product, and the information provided by the smart technologies, especially the cumulative history over time, provide the potential competitive advantage. Moreover, the benefits of the information are leveraged not by protecting information, but by giving access to it (at least partly) to the external actors. This is a remarkable shift from the product-driven model in which the competition is based on product arguments, such as weight, cost, and structural features. Furthermore, this is a shift from the dyadic solution model in which the company is jealously protecting the customer relationships and intentionally building information asymmetries in the relationships to ensure the best stake of co-operation.

Thus, according to the case evidence of this study, it clearly appears that the solution business is possibly extending its dyadic focus in value creation. Of course we still perceive that delivering customized solutions and “servitizing” the offerings remains relevant. However, the manufacturers’ service infusion discussion should be complemented with other approaches based on amore systemic perspective. Based on the results of this study, we suggest that besides solution providers, scholarly discussion of manufacturer service infusion should also include solution platform providers, which provide the prerequisites for solutions and facilitate the formation of service networks and ecosystems. Although these two strategies form a systemic combination, it is important to reiterate that the logic of value creation as well as the source of sustainable competitive advantage is very different among the options.

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Mapping value network and multiple stakeholder values for developing a new service: An industrial case study

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The understanding of value has changed, and in addition to customers, the role of also other stakeholder groups in the value creation has been emphasised. This case study presents a way in which stakeholder values can be taken into consideration in new service development process. The paper employs the case study methodology, and the case data was collected from workshops, interviews and thematic discussions. The main result of this case study is the description of the new service development process that considers stakeholders and multiple stakeholder values.

1 Introduction

The understanding of value has changed due to ‘global competition, changing markets and new technologies, opening new ways of creating value’ (Normann; Ramírez, 1993). It has been viewed and studied through many lenses: The service-dominant logic (SDL) approach highlights value co-creation and the concept of value-in-use, thus considering not only a company but looking also outside the company boundaries, mostly customers. In the new service development (NSD) approach, in turn, the value capture is based on inter-organisational planning processes that should be carried out in close collaboration with customers. However, in addition to customers, the role of also other stakeholder groups in the value creation has been emphasised as stakeholders are now paying increasing attention to the business, and especially to the responsibility of companies, and are calling for environmentally and socially responsible business. The concepts of corporate social responsibility (CSR) and sustainable development, among others, have risen to depict the expectations that business life and companies now face: responsibility for their impacts on society, and a broader understanding as well as the consideration and involvement of stakeholders (see e.g. Boutilier, 2009; COM, 2011).

Bringing together these perspectives opens up an opportunity to explore value-based new service development. Exploring the challenges and opportunities of shared value creation not just between customers but also among multiple stakeholders is important in the transition from a company-centred perspective towards a network perspective. Besides the network-view on value creation, the concept of a business ecosystem sees companies’ business environment as a larger entity, a value system, in which all stakeholders co-produce value and also capture the value from the co-operation thus creating a constantly co-evolving relationship (Moore, 1996). The new perspective on doing business is valuable for companies as identifying and understanding the interests and motivation of all parties involved also opens up possibilities of foreseeing new business opportunities and possible development paths (Geels, 2004; Antikainen et al., 2013; Valkokari et al., 2014).

Because of the networked business environment, now the success of a firm is greatly dependent on its collaboration with other organisations – whether in its close value network or in the wider business ecosystem – that have an influence on the creation and delivery of its services or products. As the traditional focus on firms as discrete entities becomes increasingly inappropriate, multiple values and conflicting interests must be considered at both the value network and business ecosystem level (Valkokari et al., 2012). With sustainable business models, companies seek to go beyond delivering economic value only and aim to generate environmental and social value for a broader range of stakeholders, thus creating competitive advantage through superior customer value while contributing to the sustainable development of the company and society (Lüdeke-Freund, 2010; Schaltegger et al., 2011; Bocken et al., 2013).

In the case this paper presents, the new service being developed is the case company’s first opening to implement a new service based on the vision of the improvement of the state of water systems and preservation of clean natural water. The case study presents a way in which stakeholder values – a key aspect of sustainability – can be taken into consideration in new service development process, and especially in one of its stages, the analysis stage. Thus it aims to identify and explore multi-stakeholder value at network level. For this purpose, the value mapping tool (Short et al., 2012; Bocken et al., 2013) plays a key role in creating a deeper understanding of multiple values across the network. Since the paper concentrates on the development process from the viewpoint of understanding stakeholder value, it excludes any detailed discussion of the service concept development or each stage of the service development process. The paper addresses the following research question: how can multi-stakeholder value across the value network and business ecosystem be identified and explored in a new service development process?

This paper begins by presenting the background to the case and the current understanding of the main themes of the study. The materials and methods chapter elaborates on the research process, and presents the value mapping tool on a more detailed level. This is followed by a brief discussion of the case findings, after which the paper concludes with a final discussion, outlines lessons learnt, and presents further research suggestions, and limitations.

1.1 Background to the case

The case company is a bioenergy supplier and developer that is now developing a new knowledge-intensive service concept for natural water treatment. A clear need for renewal, new openings and new business has been acknowledged in the case company. Thus, the new service development is seen as an important model to learn from in the development and renewal of the whole company.

The new business is based on the water treatment expertise that has been gained in the responsibility and sustainability measures within the company's core business within which this kind of expert service has been given in internal projects. This expertise is now developed and productised in order to be sold as a service to external customers who have similar challenges with natural water. Hence, the service development process now is different, too, as the in-house expertise now needs to be modified into a form of a service offering that can be sold to external customers.

The case company aim is that the new service would be applied to benefit society also in a broader sense through the improvement of natural water and that the service complies with the definition of a sustainable business model presented before: it not only delivers economic value to the case company and to the customer through improvement in productivity, but it also prepares the way for companies acquiring environmental licences and delivers environmental value through the protection and conservation of water, thus contributing also to societal wellbeing, among other values. The new service and its value need to be argued and justified to the various stakeholder groups in the business ecosystem of the company. The case company needs to be able to assure its stakeholders and open up discussions with them, as well as breaking through to the market with the new service concept. Consideration for and dialogue with the stakeholders make demands on both the new service concept and for the new service development process.

The current business of the case company is heavily dependent on its value networks that operate at a very regional level and are extensive. Also, the implementation of the new service requires building and governing an extensive network and thus consideration of multiple stakeholders who are affected by the service and have special interests in the company. At this point, the suppliers and other network actors have not been defined, but the concept is being tested in pilot projects in which already familiar partners are used. Now, as the development process is still ongoing, understanding the values and interests of the stakeholder groups as well as influencing and assuring them of the benefits of the service is in the key role.

2 Current understanding

2.1 New service development and stakeholder perspective

There are a number of models that aim to describe the new service development process. Johnson et al. (2000) present new service development as an iterative process cycle that is divided into four stages, namely: development, analysis, design and launch. At the development stage of a new service, new ideas are screened, and winning concepts are developed and tested for feasibility. Those concepts that pass this stage are then considered in the analysis stage in which their potentiality as part of a profitable business venture as well as the value network structure and information flows are considered. After this, successful concepts move to the design phase where a new service product and process is created and field-tested with appropriate personnel training and a marketing campaign. At the design stage the service is planned and defined with such specificity that it can be implemented at the next stage. At this stage, a mapping technique called service blueprinting with which the service process can be visualised in a process flow chart, can be used. Finally, a proven new service is given a full launch. (Shostack, 1984; Johnson et al., 2000.) The work and discussions carried out in this case study focus on the analysis stage of the new service development process.

The role of customers has been recognised as important for the success of a new service development. Typically the more successful new service developers have efficiently utilised information about the customer in idea generation, business evaluation and marketing plan preparation (Martin; Horne, 1995). Especially the first steps of the new service development process are known to require a deep understanding of the customers' behaviour and needs, production, and business processes (see e.g. Ojanen et al., 2008). Understanding the customer in terms of his expectations, quality perceptions, and values is said to be the key to commercial success. It is important to involve the customer in the actual development process. (Edvardsson et al., 2007.)

However, apart from the customers, the company needs to monitor and understand its environment and changes and trends in market (Edvardsson et al., 2007). The network perspective related to sustainability highlights considering stakeholders in a broader sense, thus including actors other than the direct members of a value network (i.e. lead producers, their suppliers and customers) (Boutilier, 2009). When doing sustainable business, companies need to understand not only customer value but multiple values for different stakeholders.

2.2 Value networks and multiple stakeholder value

A value network generates economic value through complex dynamic exchanges between customers and suppliers. Möller et al. (2005) propose a value system continuum when discussing the value creation potential of different kinds of value systems and networks. The continuum is a simplified illustration based on assumptions about how stable and well-defined versus emergent and still rather unstructured the value systems are (Möller; Rajala, 2007). In the context of

this case study, value networks present well-defined supply networks, and a business ecosystem can be defined as a broader value system in which all stakeholders act (Palomäki et al., 2011; Rana et al., 2012; Valkokari et al., 2013). The literature on service-dominant logic highlights that all value is co-created (Vargo; Lusch, 2006). Nevertheless, a consistent understanding of value and value co-creation remains missing (Grönroos; Voima, 2012). Furthermore, prior service literature do not often emphasize the network context in which value creation often takes place (cf. Gummeson, 2008), while the focus is in service provider – customer dyads. In the present networked economy the focus should be on reinventing value in terms of the value-creating system itself where different actors – suppliers, business partners, allies, stakeholders, and customers – work together to co-produce value (Saarijärvi et al., 2013).

The value network actors are both directly and indirectly connected to each other. Still, companies should be able to manage these collaborative settings in a way that allows each party to profit from being involved in the value co-creation. Thus, the core capabilities of the partners involved in value creation should be complementary, in order it to be possible to create superior value (Kothandaraman; Wilson, 2001). All in all, the final value that end customers of the value-creating networks want determines the nature of the member actors' operation and the role that will be valued by the other network members.

The scope of value needs to go beyond customers, immediate partners and shareholders. This involves identifying stakeholders in the business ecosystem of the company and their needs to gain precedence in the development of sustainable solution through business model innovation (Valkokari et al., 2013). This implies the need for improved and broader understanding of multi-stakeholder value – both exchange value and use-value. Furthermore, it is important to seek opportunities for alignment and exchanges between stakeholders (Rana et al., 2012). In order to develop sustainable business models, there is a need for better visibility of stakeholders in the business environment. To answer this need, this paper uses the value mapping tool for exploring a broader set of stakeholders and their value perspectives (Short et al., 2012; Bocken et al., 2013).

3 Materials and methods

The case study methodology is employed in this paper. It is suitable for analysing situations that include complex and multiple variables and processes by asking 'how' or 'why' questions about events over which the investigator has little or no control (Yin, 2003).

The case data was collected from multiple sources: workshops with company representatives, interviews and thematic discussions. The following figure (Figure 1) presents the new service development process and its stages, and the steps in the case study.

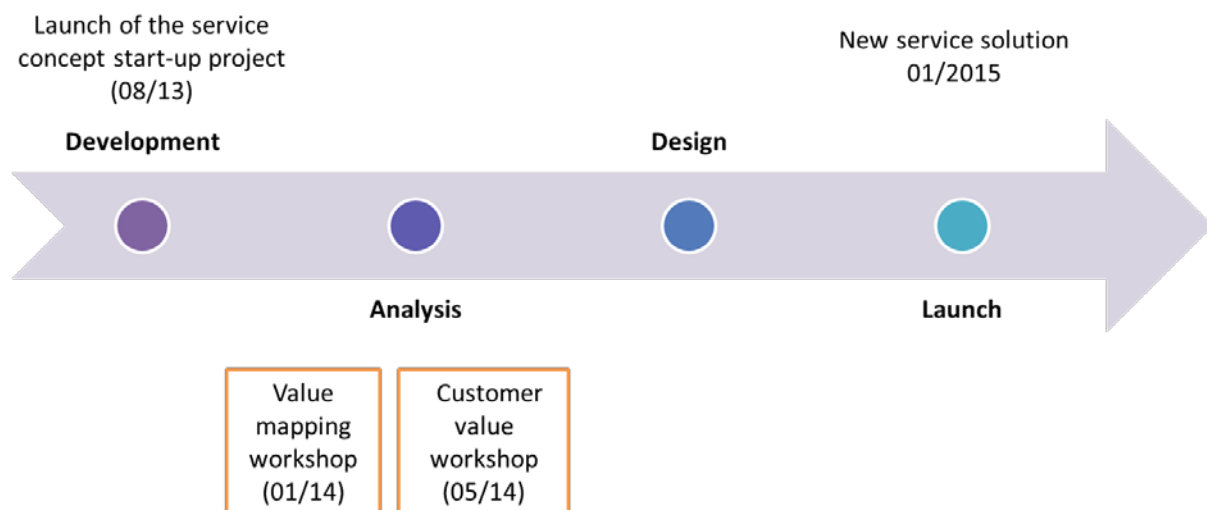


Figure 1. The new service development process and the progress of the case study.

Prior to the case study, the case company had already conducted strategic discussions regarding service development in the development stage. This study focuses on the analysis stage regarding which two workshops were organised, in addition to which interviews were carried out. The workshops provided the case study information on the value creation from the stakeholder perspective. The case company is continuing the development process in the design phase with more detailed planning on the content of the service as well as on the sales and marketing process, among other important issues. In the chapter that follows, the research process is presented, after which the value mapping tool is discussed at a more detailed level.

3.1 The research process

Within the new service development process of the case company, two workshops were organised with the company representatives. In the first workshop the key theme was value mapping. The goal was to recognise stakeholder groups relevant to the new service and to prioritise them according to their level of interests and power. This stakeholder analysis group work was carried out with a fourfold table with the above-mentioned factors as its axes (cf. Mitchell et al., 1997). After this, a value mapping exercise was carried out. In this, the value mapping tool (Rana et al., 2012; Short et al., 2012; Bocken et al., 2013) was utilised to recognise the value experienced by the stakeholders that was most relevant to the new service. Through the use of the tool the benefits and challenges from the viewpoints of the different stakeholder groups were also discussed. The tool is described more in detail in the following chapter. Five company representatives took part in the first workshop. The key result of the first workshop, the completed value mapping tool, gave a broad view to the issue of stakeholders and the positive and negative value they could experience.

The second workshop deepened this understanding by considering value from the viewpoints of three important customer groups. The first group work covered listing the elements of the new service concept. After this, the customer value of each element was discussed. Discussion was documented into an expert service–customer value table. The second part of the workshop went more deeply into the sales process of the new service. Nine company representatives took part in the second workshop.

This paper focuses especially on the stakeholder value perspective which was contributed by both of the workshops. Understanding the stakeholder value, and taking this understanding to the new service development process work is in the main focus of this paper. However, as can be seen from the workshop descriptions above, the whole case study process was broader, focusing not only on the value mapping, but aiming to support the new service development in the case company more broadly. Therefore, with the focus on the analysis stage of the new service development process, a detailed discussion on stages following the analysis stage (such as the development of the sales process or the service concept on a more detailed level) are excluded.

In addition to the workshops, five interviews were also carried out in the case. The interviews covered the following themes: sustainable development as a part of business, networks and sustainable development, product and service development, asset management, the value of sustainable development, and future needs. In this paper, especially the findings from the themes of sustainable development as a part of business, networks and sustainable development, product and service development, and future needs are discussed in respect of the change that is taking place in the company, in particular. The results and findings of the interviews are utilised in this paper in order to open up the background of the company as well as the motivation and the starting point for the new service development process.

Also, several thematic discussions were carried out throughout the process relating to the planning of the case process and the workshops and to the handling and discussions of the results.

3.2 The value mapping tool

In the first workshop, whose progress has been briefly described above, the value mapping tool (see Figure 2) was used (Short et al., 2012; Bocken et al., 2013). Originally, the tool has been developed for business modelling for sustainability, and it aims to assist companies in embedding sustainability into the core of the business model through an improved understanding of the value proposition. It takes the network perspective, and helps in analysing sustainable value creation opportunities from a multi-stakeholder perspective and understanding the positive and negative aspects of the value proposition of the value network. (Bocken et al., 2013.)



Figure 2. The value mapping tool (modified from Bocken et al., 2013; Evans et al., 2013).

In practice, the tool is used in a workshop-type of setting. Ideally, each stakeholder group considered relevant to the business would also be represented in the workshop. After introducing the tool and the context in which the tool will be used, the unit of analysis (e.g. product, service, business unit) should be defined. Then the stakeholder groups are identified and placed on the segments of the tool, and the purpose is discussed. Brainstorming is then used to populate the tool and its layers. (Bocken et al., 2013.)

In this case study, the value mapping tool was utilised in the new service development process to help identify and explore the values of stakeholders, i.e. how they would benefit from the new service and what negative outcomes there might be for them. In the value mapping tool exercise of this case study, the stakeholders were chosen based on the previous prioritisation discussion, placed on the segments, and then discussed in a brainstorming session. The discussion was documented. The guiding questions for this exercise were (cf. the descriptions of the elements in Bocken et al., 2013; Evans et al., 2013):

- Purpose: The purpose and the vision of the new service, especially from the viewpoint of responsibility and sustainability.
- Value captured: How the value of the new service for the stakeholders of its network could be added?
- Value destroyed: What values are in danger of being destroyed? Which stakeholders does this concern? How the negative consequences could be affected?
- Missed value opportunities: What positive influences, stakeholder opportunities have not been utilised and highlighted in the service concept yet? How could this be done?
- Value opportunities: Are there still some value opportunities that have not as yet been acknowledged that could bring new value to stakeholders?

In addition, the participants were asked to discuss what measures should be taken in order to move on the circle towards the higher value experienced, and thus to be able to add value to the stakeholder group in question. As a concluding discussion for this exercise, the participants were asked to review the value map as a whole, and discuss whether any of the groups now stood out in a new light or whether the order of importance had changed, and what conclusions could be drawn.

4 Case findings

In addition to identifying the stakeholders in the network of the new service concept, it is important to know and understand their needs, interests and motives in relation to the service concept. In the first workshop, the value network of the new service was depicted, based on the work that was already carried out in the company. The following figure (Figure 3) presents the stakeholder groups in the network and broader business ecosystem of the new service.



Figure 3. The network and business ecosystem of the new service.

Group work on stakeholder analysis that followed (Figure 4) looked into the importance of the different groups to the implementation of the new service in order to give the company a better understanding of how to proceed with contacting and discussions with the groups, and which ones especially need special attention.

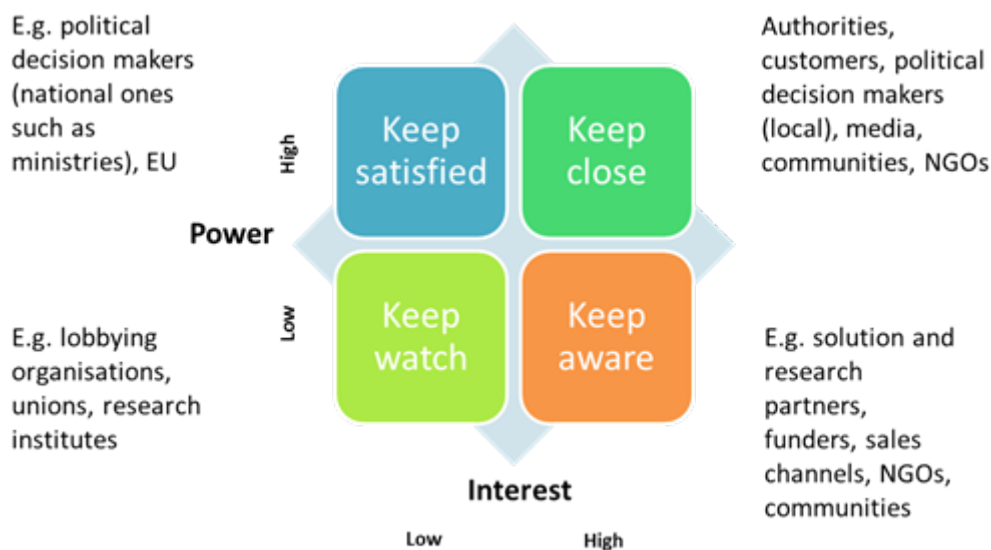


Figure 4. Stakeholder analysis.

Keeping these discussions in mind, the workshop proceeded to the value mapping exercise. With the greater aim of the company to be able to influence and get the stakeholders committed to the new service once it is launched, the value of the new service experienced by the different stakeholder groups was assessed and discussed. The findings were entered on the value map (Figure 5).



Figure 5. Some examples from the value mapping tool exercise for the new service.

As a conclusion to this exercise, the findings were discussed together, especially from the viewpoint of what could be changed or done better in order to bring more value to the stakeholders relevant to the new service. Also, the connections between the different stakeholder groups were brought up.

The first workshop created an understanding of the value network and broader business ecosystem of the new service concept. In practice, the identification and prioritisation of stakeholder groups and the value mapping gave the case company inputs to their influencing and communication planning. Taking the standpoint of each stakeholder group and considering the benefits and challenges, and value experienced of the new service supports the understanding of how different groups should be approached and engaged in discussion, and also the actual service development work.

The first exercise of the second workshop resulted in a list of possible service elements that the company could offer under the new service concept. The suggested service elements included support in applying for funding and subsidies, the preparation of calculations, reporting and modelling, impact assessments and consulting services, to name a few. For each of the named service forms, values for the key customer groups were discussed. This discussion brought up customer values such as ease, cost effectiveness and savings, lower risks, complying with regulation, less bureaucracy, clear processes, access to the right people, authorities and other companies through the networks of the case company, competitive advantage, etc.

The findings of the second workshop supported the case company in their work in describing the service concept and its main elements, marketing and sales planning (especially the work on customer value), communication planning, sales material as well as defining the sales process. The workshop gave the company tools for the further strategic development work.

5 Conclusions

The main result of this case study was the description of the new service development process that considers stakeholders and multiple stakeholder values. The findings of the study highlighted that a multilevel approach that extends also to the analysis of other stakeholders and their values instead of to customers only is required in order to explore the business opportunities and challenges on network level and to achieve systemic change towards sustainable value-based business models within the networked business environment.

The contribution to the theoretical discussion in the field of new service development lies in the stakeholder perspective. Both value co-creation and new service development discussions are very customer-focused: in value co-creation literature value in-use is emphasised, whereas new service development stresses involving customers in the process. The meaning of also considering other stakeholder groups in the business ecosystem and the value they

experience is important, because in a networked business environment, offering services causes a need for a new kind of distribution of work, thus changing actors' business logics. Also being able to develop responsible service business requires this kind of broader consideration of the business environment and of the stakeholder value not just from an economic perspective but also from environmental and social perspectives.

This case study gave the company the possibility to explore and analyse the multiple value perspectives and interests of stakeholders, especially from the viewpoint of responsibility and sustainable development. Thus, the study gave the case company tools that support the company in its efforts to develop service offerings and business that considers its business ecosystem and that delivers economic, environmental and social value to stakeholders. For the case company, the new service development process has been an important step in renewing its offering and operations, and the study presented a novel example of how to refine in-house expertise for a service for external customers. The case company also benefited from the case study in several concrete ways: e.g. the stakeholder analysis and value mapping supported planning how to communicate with stakeholders, and the customer segment analysis especially supported sales and marketing planning.

The lessons learned from this process could motivate and encourage broadening the service offering of the company further in the future, and work as a model for other new service business openings that are modified from internal services to external customers. To take this further, the company may need more resources and investment in R&D activities as well as development of the processes. As strong emphasis on services requires a change in the role of a company from an expert to a customer's problem solver, the company representatives selling the new service may need to adapt their mind-set according to the new role. This may also have implications for the sales process development currently ongoing in the case company.

In the future, the company continues to work with the service development process. After the main components of the new service concept have been described, the work may continue with more precise descriptions of the business models of each service element, and with evaluating their value to the most relevant stakeholders thus attaining a more detailed level in the analysis. Each service element is valuable in a different way, and thus also the ways they affect stakeholders are unique.

This paper has only discussed some parts of the new service development process, mainly those that dealt with identifying and exploring multi-stakeholder value at network and business ecosystem levels. An interesting further study idea would be to follow the process and the launch and implementation of the new service. However, at this point it is impossible to say yet how this new service opening will affect the company as a whole. In the future, studying the concept of multi-stakeholder value would also be interesting. Questions such as how it could be defined or measured are just some important viewpoints on this issue.

There are also some limitations regarding the use of the tools. Naturally, the company has continued to work with the workshop findings but with the limitation of just two workshop days, these discussions and iterative rounds are not part of the material of this case study. In addition, involving stakeholder representatives in this discussion would be important and very beneficial, especially in the case of the value mapping tool. Getting stakeholders more involved in the new service development process is a challenge to be considered also for the case company in the future. It is possible only if the factors that motivate stakeholders are truly understood in the company and communicated to the stakeholders. To achieve this, the company needs to start with inter-company discussions. The workshops and related discussions carried out in this case study have laid a foundation and given new tools and ideas to the company representatives for this communication and for the continuing service development.

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The need for Evidence Informed Practice in foster care social services

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We present a case study involving a regional child welfare service in Italy. The limitation of financial resources motivated the local agency's management to systematically explore the information and data flow on foster youth in charge by the service. A qualitative exploratory analysis on perceived information/data flow within the whole service referring both to content and structure, was carried out. Core categories of data shared within the service were identified. Critical Incidents within the inter-services information flow were codified and highlighted that evidence based evaluation and communication in health service was associated with a relevant percentage of perceived critical issues. Future research should be addressed to improve evidence informed practices in child welfare.

2 Introduction

1.1 The regional child welfare agency

The context of our study is the regional agency of child welfare in Trentino South Tirol. 150 social workers are active in 2014: 1258 minors are in charge of the service and are eligible for out-of-home placement or already placed in group homes residential centres or day-care services (day time homes) (Table 1). The out-of-home placement service assigned 64% of foster youth to foster home and the 36% to group home for daytime care service. Removal from unsafe home environment should ensure children's wellbeing. Given the great number of different guidelines and standards for out of home placement, individual discretion of social workers remains a critical component of decision-making processes (Chor; McClelland; Weiner; Jordan; Lyons, 2013. Bickman; Karver; Schut, 1997. Pedrazza; Trifiletti; Berlanda; Di Bernardo, 2013).

The agency requires the contribution of four different services: the social service; the educative service (which provides for residential homes, day-time care homes services for foster youth and domestic care service); the health service (medical professionals) and the educational service (nurseries, kindergartens and schools) (Figure 1). 2144 practitioners and professionals are active in the agency in 2014: 150 case workers, managed foster youth cases with the active, recursive and mainly in protocols regulated and registered contribution of 529 educators, 650 teachers, responsible for Special Educational Need-pupils, and 815 medical professionals.

Table 1. Number of children in foster care social service.

Services type	Number of children in charge	<p>■ Residential Services ■ Daytime Services</p>
Residential Services	103	
Daytime Services	971	
Home Help Services (family support)	184	
TOTAL	1258	

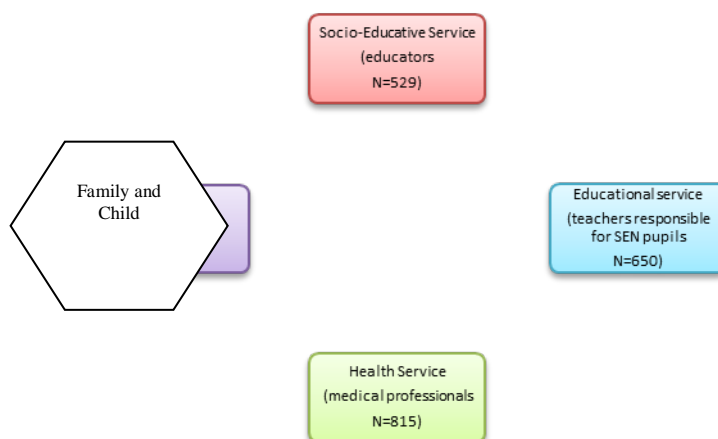


Figure 1. Foster care social services.

70% of the total number of children in charge of the service are also classified as pupils with special educational needs (Table 2).

European countries estimate the number of SEN (pupils with special educational needs) pupils from less than 1 per cent in some countries to more than 20 per cent in others. Variations appear to stem from differences in how individual countries define SEN and whether estimates are based on administrative sources used in some government agencies or national cohort or survey data in others. To overcome issues with international comparisons the OECD has devised a framework of A, B and C categories where Category A refers to a disability from an organic impairment (Disability); Category B refers to intellectual, behavioral or other learning difficulties (Difficulties); and Category C refers to difficulties because of social disadvantage (Disadvantage). Large differences remain, however, even when using the SENDDD (Disability, Difficulties and Disadvantage) categories (OECD; 2005. Banks; McCoy, 2011, 1-2).

Table 2. Trend in the number of pupils with special educational needs (SEN – Category C).

Type of school	Percentage of pupils with SEN (Category C) 2012/2013	Percentage of pupils with SEN (Category C) 2013/2014
Primary school	1.50%	1.54%
Middle school		2.80%
Vocational school	1.46%	2.87%
High school	0.17%	0.27%
TOTAL	1.10%	1.62%

2 Theoretical Framework

2.1 Decision-making process in child welfare agency

The local social work agency deals with decision tasks concerning the relational and social rather than the physical world. In addition the social reality, it deals with, consists of foster youth and families of origin who usually attach very differentiated meanings to their home behaviour (Mead, 1934). The agency's staff should analyze and decompose the social and health situation of the child and the family into its parts and elements in order to accomplish the rational analysis of the all system.

In addition social workers have to deal with a double commitment: on the one hand they have to promote emancipation and autonomy, on the other hand they use means of social control and strive also for social order in domestic inter-personal context (Gambrill, 1997). The subjective perceived conflict related to such different aims and goals cannot be rationally and/or by authority resolved, and so the tendency towards intuitive decision-making processes is likely to be high (van de Luitgaarden, 2009. Hammond; Hamm; Grassia; Pearson, 1997).

Hartman (1992) and Leung (2007) describe this specific goal of social service as a paradox: in their dealing practice, social workers have, on the one hand, to believe in their expert knowledge referred to their understanding of the client's situation. On the other hand they are committed to core values of care and social justice and should take into account client's values and perspectives.

The co-constructive decision-making process within the agency shouldn't be exclusively an application of the so call "expert knowledge", it should rather include client's issues in the whole inter-services evaluation of the child's situation.

The agency's staff as any child protection organization is heavy in procedural documentation (Gambrill; Shlonsky, 2001). In addition the high documentation demand is associated with high caseload and high turn over staff. Last but not least, high sensitivity to negative media exposure attributes higher desirability to supervision than to continuity of expertise (Munro, 2009).

Von Malmberg (2007) explored the role of Local Authorities in actor-networks related to regional sustainable development. In their potential ability to stimulate learning and innovation for sustainable development Local Authorities can act as "teachers" or "tutors" in networks. They typically support incremental innovation rather than radical system innovation, stimulating long-term changes. Empirical studies suggest that the active participation of Local Authority as "teacher" in the network is associated with closer collaboration between all members. In our study Local Authority of the child welfare agency played the role of "teacher" referring to two different goals:

- 1) it supported follow up actions after the introduction of a new tool at the educative service level of the agency;
- 2) it supported a qualitative exploratory study of the inter-services information/flow within the agency.

Both goals were achieved with the support of academic researchers involved from the beginning of the intervention as partners in the following paragraphs described action research.

2.2 Data collection and flow of information on foster youth

In their face to face daily practice social workers have to understand the users' social situation and personal condition trusting in their own ability to analyze collected data and information with respect to problem natures, targets, methods of intervention and intervention stages (Reid, 2002. Pincus; Minahan, 1973). They are committed to take care of the user avoiding judgment, as Leung (2007, 192) argues they "are committed to core values of care and social justice and the belief that they should not participate in any oppressive practice".

The initial assessment, the evaluation of situations before intervention, the diagnostic-evaluation *in itinere* and the outcome evaluation, which typically allows team members to determine the conclusion of the social service intervention, are crucial aspects in child welfare (Boutanquoi; Bournel-Bosson; Minary, 2013). In order to achieve these goals professionals develop tools, which are meant to be a guide for collecting data and organize information. Data and information from different services, health, care, educational and social, have to be gather at the intra-service level and shared at the inter-services level, in a meaning-making dialogue where the agency's knowledge is produced. This dialogue is not a simple exchange of information at a cognitive level, it implies interpersonal perceptions of emotions and attitudes (Leung, 2009).

The epistemological premises guiding knowledge production practices through assessment tools of each service operator, social, health professionals and educational practitioners, vary relating to the following aspects:

- Epistemological premises and theoretical frameworks;
- Setting;
- Method;
- Context and content of outcome evaluation;

These different perspectives (Table 3 and Table 4) are necessary in order to enable the service as a whole to gather and organize data and information on foster youth relating to each aspect of their life and assets.

While within each service assessments and outcome evaluations are congruent with epistemological premises and methods, we often notice that the final inter-services outcome evaluation cannot be congruent with each one of the different approaches: health-care, social, educational and care. There is a need for co-construction of shared meaning in order to integrate the high amount of information and data flowing from different services to the social work case-worker who is entrusted with the responsibility of general coordination.

According to Leung (2009) practitioners apply, modify and share tools according to their needs.

The tacit dimension of knowledge is linked to the implicit premises each professional adopts, and it orients interpretation practices relating to "what others know" referring to each case. As Tsoukas and Vladimirou (2001) argue such knowledge is difficult to be verbalized.

Table 3. Knowledge as a product.


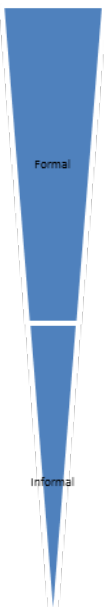
Child welfare services	Expert Knowledge	Setting of data collection	Method	Focus	Protocols
Medical professionals	Evidence based practice (EBP)	Formal (Objective/ Clinical Descriptive)	Quantitative	Physic and Psychological Health	
Teachers	School records and Written reports (related to standard in education)	Formal (Objective/ Comparative evaluation)	Quantitative	Learning Cognitive and affective development	
Case workers	Explanatory statements and Memo/evidence informed practice (EIP)	Both formal and informal (Relational)	Quantitative Qualitative	Safety and social integration	
Educators	Narrative reports (user-centered practice)	Both formal and informal (Relational)	Qualitative	Autonomy and wellbeing	

Table 4. Knowledge as a process.

Child welfare services	Shared data/information	Sharing Environment	Protocols
Medical professionals	Inventories, certifications, assessments Results of medical check-ups and treatments	Technological means Rare face to face encounters	
Teachers	Reports	Face to face encounters and records	
Case workers	Narratives and Reports	Face to face encounters and reports	
Educators	Narratives and Reports	Face to face encounters and reports	

As shown in Table 3 and Table 4, we argue that data and information on foster children as a product of each professionals' work experience can be located on a continuum flowing from "vivid" evidences (Munro, 1999) resulting from rigid and officially prescribed protocols to more "abstract and dull" (Munro, 1999), usually overlooked data, resulting from *relational* practices and subjectively interpreted evaluations (Ellström, 2010), where improvisation is often required.

Tools facilitate the organization and collection of data and equip the observation activities. Boutanquoi, Bournel-Bosson and Minary (2013) argue that the use of tools raises several questions:

- the items used are related to cultural and social norms, not always shared by families and professionals;
- tools often reinforce individual and specific professional competences rather than facilitate the co-construction of meaning and significance of data on foster youth;

- data and information on foster youth are the starting point but a second relevant achievement has to be addressed to: one should contextualize them and thereby ascribe them meaning (Boutanquoi; Bournel-Bosson; Minary, 2013).

2.3 Knowledge Management in Social Service

We regard at knowledge as an ongoing "social accomplishment moving, fluid and embedded in social relationships" (Leung, 2007. Orlikowski, 2002. Styhre, 2003).

According to Leung (2009) knowledge management can be seen as lying on a continuum from knowledge-as-an-object to knowledge-as-a-process. The first is referred to information, procedural and theoretical knowledge. The second encompassed skill enactment, practice reasoning, work process knowledge and value sharing process. Between these two types of knowledge Leung identifies the role of tools and mental models constituting the so call "Knowledge-in-midway".

According to Lee and Austin (2012) the building of a knowledge sharing team is based on two main activities: 1) the type of information professional managed (managing what we know); 2) the integration of what others know into the organization. The first activity is related to the explicit information in agency's and professionals' documentations. "Integrating" refers to the tacit knowledge held in the procedural and declarative memory and experiences of the staff.

According to Ipe (2003) organizational culture influences knowledge sharing by the nature of knowledge and the opportunity organization gives to share. Personal motivations are also a relevant factor involved in the sharing practices.

Data in the child welfare agency can thus be classified relating to their nature and to the type of sharing opportunities in which they can be integrated in the global inter-services assessment and evaluation of the child. In the Italian regional child welfare agency two types of data can be identified: on the one end of an hypothetical continuum we find medical professionals gathering vivid and concrete data on minors from a basically positivistic and biomedical prospective. The medical approach is thereby conceived as a merely cognitive and rational enterprise. On the opposite side of the continuum we find educators concerned with a great amount of relational issues, gathering data from a mainly humanistic and psychosocial perspective combining ethical values as "autonomy and self-fulfillment" with minors needs and preferences (Table 3 and Table 4).

Knowledge as a product shifts (Table 3) from the by medical professionals' Evidence Based Practice shaped, quantitative data, to the educators' *narratively* and *Grounded Theory* based, qualitative data pole. Looking at the agency's knowledge-as-a-process (Table 4) we realize that data and information are shared in quite polarized types of environments: on the one hand medical professionals tend to attach greater importance to technological means, on the opposite pole educators usually prefer face to face encounters.

3 Research

An institutional/political mandate, which usually introduces innovation in public sector, (Mergel; Desouza, 2013) involved academic researchers and the regional child welfare agency. In the present study researchers were asked to play a mediating role between agency's management and professionals/practitioners. Their action-research activities had to support the child welfare agency and its professionals to optimize inter-professional data handling and reporting procedures, being the decision making process in child welfare the result of several complex inter-professional activities (Nouwen; Decuyper; Put, 2012). After a two-year's supervision extended to educative care service practitioners (from 2008 until 2010) a new tool for systematic observation of minors' behavior was introduced.

The employee driven innovation (Høyrup, 2010) let two consequences come through:

1. The introduction of the new tool (Pedrazza; Berlanda, 2014) activated a subtle competition under the very differently organized residential and daytime services from the third sector. In fact their survival depends on the public social service local department's trust in their reliability and effectiveness. The economic crisis puts pressure on state budgets and induces changes and innovations which seek to cut costs while often increasing the quality of the service provided (Gallouj; Zanfei, 2013).
2. The local agency/department of child welfare expressed interest in the third sector organization's innovation and asked researchers and case workers team to start research activities and dissemination activities to optimize the information flow on foster youth at a provincial level, involving different professionals and all third sector organizations. A sort of domino-effect (knock-on effect) started and many third sector organizations shifted from a "pure" narrative and qualitative approach to a more quantitative/systematic way to evaluate their intervention on foster youth, so that similar new tools were introduced and implemented.

Researchers were asked to assess the impact of the implementation of the new tool.

In order to achieve this goal the researchers' team started an exploratory qualitative study to identify the features of the information flow under different professionals and practitioners involved in the agency.

3.1 Sample

Nine focus group were carried out, involving 97 professionals (Figure 2). Each focus group involve from 10 to 12 participants at a time. Participants were selected according to following criteria: 1) personal intrinsic high motivation to take part to the research, 2) 10 years experience gained in the local child welfare agency, 3) their distribution within each territorial service belonging to the agency. Costs of the investigation was supported by a local private foundation (CARITRO, 2013, Trento).

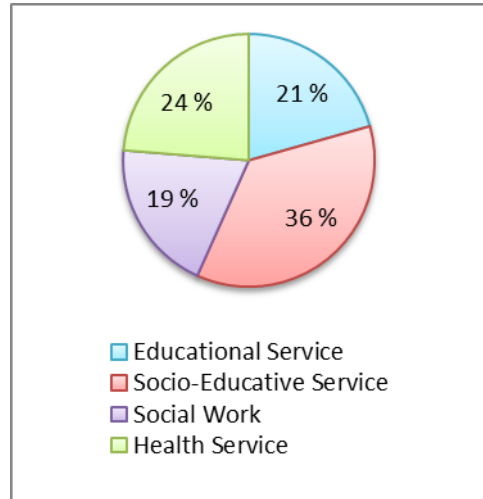


Figure 2. Sample: focus group participants' distribution.

3.2 Method

Data were collected in February-May 2014.

Main objective of this exploratory and co-constructive procedure was to shift tacit knowledge from its implicit towards its explicit and reflective dimension.

Low structured focus groups were carried out in order to explore following aspects:

- core category and focus of systematic observation of minors state, attitudes and behaviors relating to each professional/practitioner (indexes of foster youth wellbeing);
- characteristics of the information flow: formal (planned meetings) *versus* informal context (i.e. phone calls, informal meetings which not always are put on records) of communication; /technologically mediated *versus* face to face encounters.
- information's flow emergent critical incidents (Flanagan, 1954).

We followed Smith's (1995) procedural and methodological recommendations for analyzing qualitative data drawn from focus group transcripts. We read the transcripts numerous times, during which we noted everything that seemed interesting or significant, listed the themes that emerged and examined the relationships between them, in an attempt to understand exactly what the interviewees had said in order to interpret their interviews appropriately.

According to Dey (1993) qualitative analysis involves breaking up the data into smaller units then reassembling them in new ways. During the classification process (software N-vivo8) we assigned the data to categories on the basis of relevant characteristics and meanings. The categories gather together similar responses based on the principle of content equivalence/similarity. We identified salient themes, recurring ideas or language, and the belief patterns that connect workers with the context. We generated categories ad hoc for each theme via an inductive process (key words or abbreviations). Each minimum unit of meaning is classified by attributing one or more categories to it.

Analysis was structured around three conceptually progressive coding operations (Strauss; Corbin, 2008): 1) open or substantive coding, 2) axial coding, and 3) selective coding. At this point, all the categories have been determined and the links between them have been established.

During our analysis we attempted to identify the most important meaning categories to explain the content of the data, and assembled them into super-ordinate categories.

According to the qualitative analyze through N-Vivo software we were also able to identify the *parent categories* and the *child categories*.

4 Results

4.1 Core categories of professionals and practitioners' systematic observation and data collection on foster youth

According to the Nouwen, Decuyper and Put (2012) model of effective decision-making in child welfare teams *alignment* is a central feature of the *team architecture*. We looked for alignment opportunities distinguishing (relating to each different professional or practitioner) the focus of each professional's observation practices. The highest level of alignment opportunities corresponds to the highest overlapping's degree of variables and foster children's issues. Redundancy offers a wide range of alignment opportunities.

The informal domestic context of the care service allows practitioners to focus on foster youth autonomy and wellbeing in daily interactions. Social competence in domestic and informal context, trust in adults and peers, and routines were codified as parental nodes. Child nodes are presented in Figure 3.

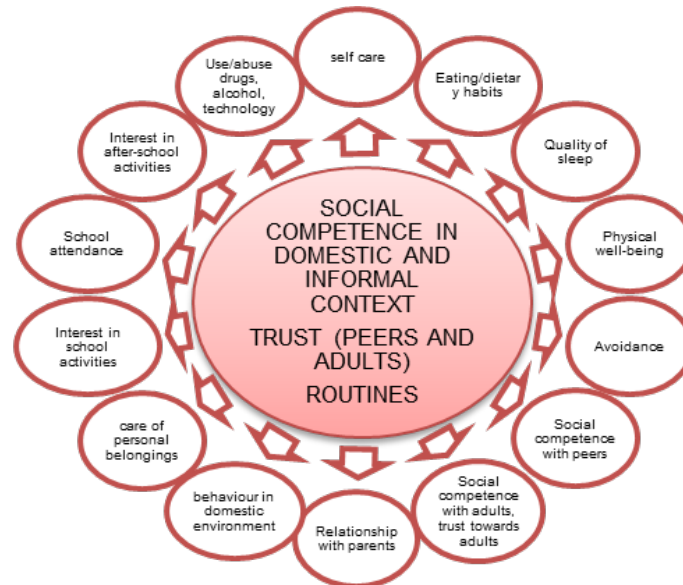


Figure 3. Core category of educators' systematic observation and data collection practices on foster youth.

The recursive interactions between users (children and family of origin) and case worker allow the latter to gather data/information on foster youth which we organized and codified around following parental nodes: informal and formal network, parental skills, and autonomy and wellbeing. Child nodes are presented in Figure 4.

Teachers focus their attention on children gathering information and data on school performance and attendance, and social competence in structured and less structured environment. Child nodes are available in Figure 5.

Medical professional focus their attention on foster youth in order to assess and classify their mental, emotional and physical health. Child nodes are presented in Figure 6.

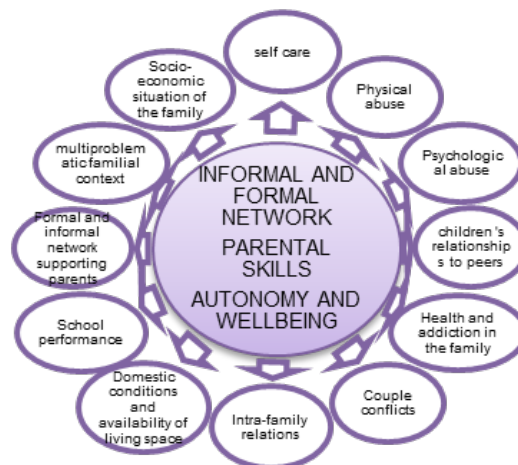


Figure 4. Core category of social workers' systematic observation and data collection practices on foster youth.

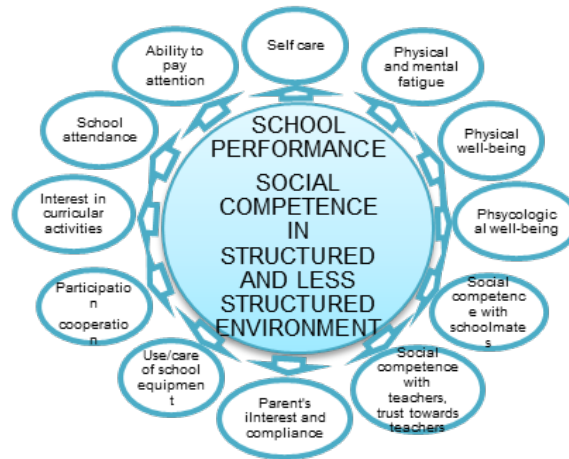


Figure 5. Core category of teachers' systematic observation and data collection practices on foster youth.

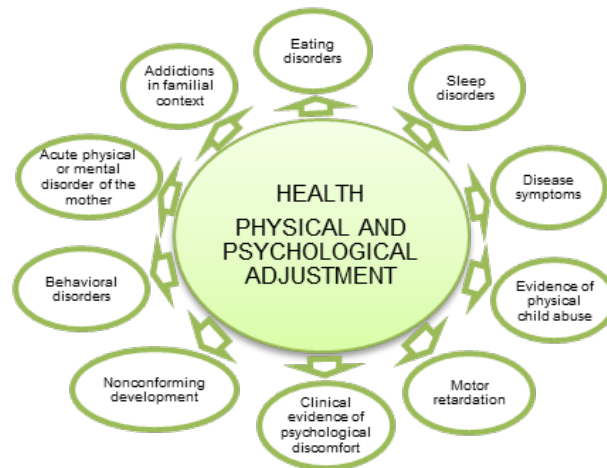


Figure 6. Core category of medical professionals' systematic observation and data collection practices on foster youth.

Alignment opportunities have been identified among professionals, each one moving from his/hers own theoretical framework and experience identifying injury indicators and well being indexes in foster children. Partial overlapping and redundancy are detectable above all between teachers and educators (self care, school attendance, interest in curricular, extracurricular and after-school activities, social competence). Medical professional's observation partially overlaps with case-workers evaluation of parental skills and child physical wellbeing. The common highest overlapping area including all professionals and practitioners refers to child's social skills, with particular reference to trust towards adults and peers, self-care and self-confidence.

4.2 Communication flow in child service

We also analyzed the communication flow and its characteristics: its formality or informality and redundancy, where high redundancy corresponds to high informal communication needs.

Formal settings of communication are typically regulated by agency's protocols. In accordance with those protocols inter-services communication settings and opportunities should offer practitioners and professionals sufficient time and space for exchanging data, experiences and for integrating their own knowledge with others' knowledge and perspectives on foster youth.

An extensive and multi-disciplinary review of team decision-making in child welfare allows Nouwen, Decuyper and Put (2012) to propose a framework as guideline to evaluation and analysis of the whole process. Authors underline that very few study analyzed the explicit team decision-making process. They propose an effective decision-making team framework which encompasses the above mentioned *team architecture*, referred to committed professional, trust and alignment, and *team learning*, referred to collective information processing and shared mental models.

According to this model we distinguished formal from informal communication opportunities and settings constituting the *topos* where mental models are shared and discussed.

Figure number 7 illustrates that there is not significant differences between the percentage of formal and informal communication. Medical professionals are exposed to the highest percentage of formal communication with other professionals and practitioners, whereas educators are involved in the least amount of formal communication opportunities. It is of interest to underline that existent formal protocols shared by all professionals and practitioners are clearly not sufficient to reduce information redundancy in the inter-professional information flow. In fact professionals undertake a high amount of informal interpersonal direct contacts.

Although engaging in a high amount of formal and informal communication medical practitioner exhibit the largest percentage of critical incidents. The high registered redundancy in the communication flow, made explicit by the large number of informal meetings, seems to simply multiply the number of inter-professional communication opportunities without supporting mutual understanding and without meeting inter-professional information and cooperation needs.

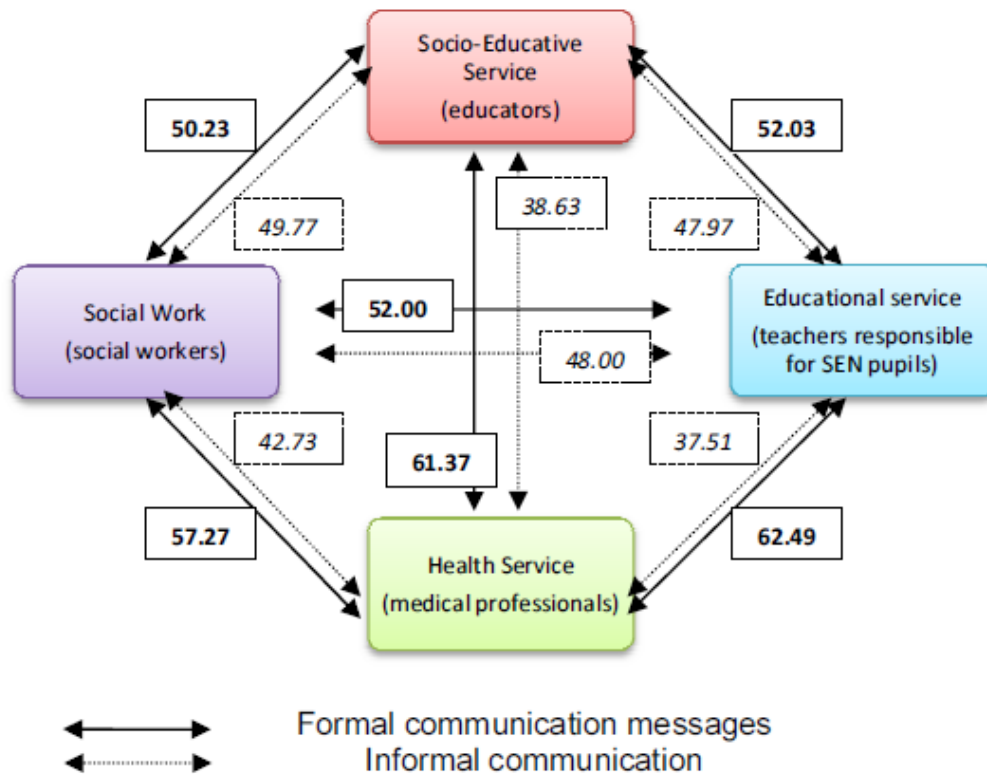


Figure 7. Communication flow in foster care social services.

4.3 Critical incidents in the communication flow

Inter-services communication's critical incidents (Figure 8) refer to perceived critical issues including lack of trust (38.8%), problematic sharing practices (37.3%), uneven service structure (15%), and lack of intrinsic motivation (8.9%).

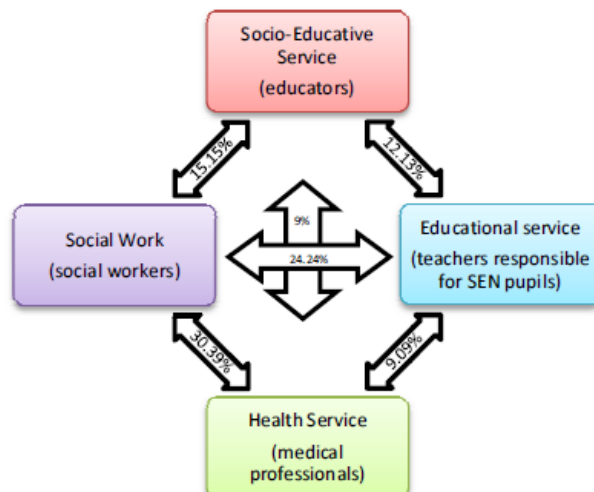


Figure 8. Critical incidents in inter-services communication.

Integrating inter-services and intra-service critical incidents (Figure 9) we identified the following distribution: 36% of critical incidents occur in communication practices involving medical professionals, 33% refer to case workers, 22% to teachers and 9% to educators.

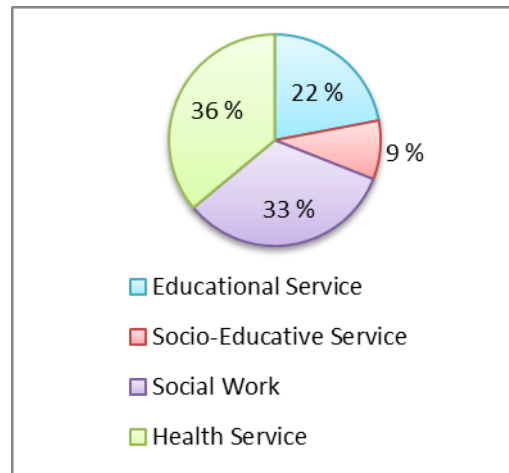


Figure 9. Critical incidents in intra- and inter-services communication.

Our findings (listed in Figure 10) are consistent with literature: medical professionals are unlikely to report on child abuse or fail in updating child protection treatment trajectories. They fail (Vulliamy; Sullivan, 2000) because of lack of confidence in child protection services, (Kalichman, 1993. Zellman, 1990); because of ethical considerations related to confidentiality (Kalichman, 1993) and because of high perceived costs of the reporter (Zellman, 1990). According to Vulliamy and Sullivan (2000) this is an international issue that cannot be addressed only by institutional protocols.

- Reluctance and extreme caution in reporting maltreatment on child abuse and neglect issues to case worker (consistent with Vulliamy and Sullivan, 2000)
- School administrative staff's preference to ask for neuropsychiatric evaluation and medical assessment of the child (in order to be eligible for financial support)
- Law 104/92 requires the participation of medical professionals in school staff meetings in order to provide support for pupils with SEN and disabilities. Because of reported lack of time, medical professionals typically don't comply with this national regulation.
- When diagnosis are requested medical professionals appreciate written communication rather than face to face communication with other professionals.
- Physicians often fail to report on children in charge of the service because of ethical consideration related to confidentiality (also reported by Kalichman, 1993).
- Physicians fail to report on children because of high costs to the reporter such as time spent making reports and court attendance (also reported by Zellman, 1990).
- Medical professional perceive high work-overload, they are not available even for planned meeting (school and socio-educative care service)
- Partial overlapping of private and public service (medical professional availability in public service is limited because of their engagement in private medical practice)
- Despite facilitating and speeding up interventions, protocols tend to discourage professional from looking for support and from exchanging experiences, evaluations and information on foster youth.
- Medical professionals often meet teachers' need for neuropsychiatric evaluation rather than educators' need for more integration of information and sharing about opportunities for parents' support and economical support to families.

Figure 10. Health Service's referred Critical Incidents (referred to child welfare agency's issues).

5 Discussion

One of the aims of the introduction of the new tool for systematic observation in the socio-educative care-service was to align educative service assessment procedures to the often over-estimated evidence base practice in social and health service.

Despite this, the follow up, after introduction of the tool, is associated to a high amount of critical incident ascribable to the health service which usually focuses on adopting the findings of empirical research, promoting thereby a reductionist view of human behaviour (Angel, 2003). Child welfare is too complex to benefit from an emphasis on only empirically proved programs (Collins-Camargo; Sullivan; Murphy, 2011). As above mentioned van de Luitgaarden (2009, 3) states that social work is to be placed closer to the intuitive pole of the cognitive continuum than to the analytical pole. The basic elements that are needed for any effective decision making process are not identifiable with any sort of objective statements and thus are always subjective, relative and debatable. Medical professionals meet

other professionals' needs for assessment and evaluation, but are seldom available for deeper meaning co-construction and sharing. Their EBP is often too mechanistic and ignores sometimes the unique characteristics both of the user and of the other practitioner medical professionals have to share information with (Nevo; Slonim-Nevo, 2011).

Low rates of medical professionals' availability to integrate their data with needed information, could be ascribable to following factors:

- The regional child welfare agency we are dealing with, is a public service and medical professionals devote part of their work-time to private practice.
- Intuitive reasoning, needed in social service, tends to be biased towards "vivid" and concrete evidences (Munro, 1999). Medical assessments and evaluations are concrete enough and therefore, probably, overestimated in their informative potential.
- Cognitive biases (e.g. egocentric bias) are rampant (Leung; Tong, Ho, 2004. Gilovich; Medvec; Savitsky, 2000) in any negotiation including overestimation of own inputs (Lerner; Somers; Reid; Chiriboga; Tierney, 1991. Ross; Sicoly, 1979), overconfidence in own arguments (Bazerman; Neale, 1982) and false consensus effect (Ross; Green; House, 1977).

Case workers have to strive hard in order to integrate the wide range of data they deal with: subjective, narratively produced and intuitively elaborated data of educative care practitioners (e.g.) and concrete and "vivid", but often not contextualized, medical evaluations.

Further studies on the "information flow" in child welfare are needed because literature references show that group members' estimations are more accurate, that is cognitive biases can be reduced, being error a function of *information access* and *interpersonal ties* such as trust and confidence (Kitts, 2003).

5.1 Implication for practice

Literature (Epstein, 2009. Franklin; Hopson, 2007. Brownson; Fielding; Maylahn, 2009. Collins-Camargo; Sullivan; Murphy, 2011) indicates one should move from a pure evidence-based practice to an informed based, knowledge-based practice that encompasses both reflective and empirical types of knowledge allowing socio-educative, educational, social and care practitioner to perceive themselves, in front of medical professionals, as knowledge makers and not just knowledge takers. In addition EBP implementation in mental and social services is often related to concerns about large amount of training demands, impact on work load, decreased job autonomy, increased stress, which typically increase staff turn-over (Aarons; Fettes; Flores; Sommerfeld, 2009. Masatti; Sweeney; Panzano; Roth, 2008).

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Internal and external stimuli toward value driven strategies in pricing

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For many industrial service companies widely applied cost based approaches to pricing of their services at best limits the companies' growth, but even more often creates a significant barrier to compete with more cost efficient Eastern suppliers that are also more flexible in pricing. Despite of investments into new value driven approaches and effort to research and develop industrial service concepts the shift toward new pricing models remains difficult. The objective of this paper is to discuss the challenges and opportunities with pricing of industrial services in order to develop them into stimuli toward value driven strategies in pricing, and also propose some practical advice how to proceed toward value driven models in pricing.

1 Introduction

By providing services in addition to their products, manufacturers aim to implement a strategy to repel competitive pressures from global competition and to compensate for the decreasing margins of their industrial products (Sawhney, 2006, Vandermerwe; Rada, 1988, Wise; Baumgartner, 1999). Manufacturing companies are inspired by professional service companies that, compared to manufacturers, typically require lower fixed capital investment, frequently provide a more predictable stream of revenue, and often generate higher profit margins (Ostrom et al., 2010). Several positive consequences have been connected to the development of services by manufacturers, including extra invoicing, enhanced profitability and performance, a more steady cash flow, and a better corporate image (Mathieu, 2001, Kuusisto; Mayer, 2003, Malleret, 2006, Kohtamäki; Partanen; Möller, 2012).

However, there is a strong opinion, supported by a growing research body, that only a few manufacturers have achieved the ambitious financial objectives related to services (Gebauer; Fleisch; Friedli, 2005). According to Gebauer et al. (2005), the paradox of industrial services is that manufacturing companies make large investments in the development of services without generating adequate return on them. Researchers and practitioners admit that one of the major reasons for that is in pricing. The pricing mechanisms of most of the traditional service organizations are not based on a sophisticated understanding of the specific customer value they deliver, but instead on more general and simplistic approaches such as cost-based pricing plus considering the competition's prices (Zeithaml; Bitner; Gremler, 2006, Monroe, 1989, Tung; Capella; Tat, 1997). Thus, the service suppliers deliver additional value to the customers by services, but they are not able to benefit fully since they are not able to measure and utilize value for pricing, and therefore they have to compete based on low price and cost efficiency.

Building a comprehensive pricing method for services is a challenge for firms; many authors associate the challenges in service pricing with different aspects of complexity (Mitra; Capella, 1997, Dearden, 1978, Lovelock, 1981, Thomas, 1978, Berry; Yadav, 1996, Docters et al., 2004, Cooper; Jackson, 1988, Cowell, 1984, Bolton et al., 2007). However, as recent research shows (e.g. Reen, 2014, Reen; Windischhoffer; Wikström, 2010) the actual reason is a lack of value driven strategy in pricing and cost-oriented mindset of industrial companies. Markets, technology development in low cost countries, emerging new business models – all create stimuli toward the development of new value driven pricing strategies. And the companies who will be able to implement such strategy create unique competitive advantage that is built on customer relations and the company's new capabilities. Therefore the objective of this paper is to discuss the challenges and opportunities with pricing of industrial services and systematise them in order to develop them into stimuli toward value driven strategies in pricing and also propose some practical advice how to proceed toward value driven models in pricing.

2 Literature review

A growing share of services in national economies poses the questions how to describe and manage services, and reveals that existing product-oriented theories and models are not precise for services (Egan, 2001). Despite the increasing attention from the researchers to the service phenomena, service research still lacks such fundamentals as an univocal definition of service (Edvardsson et al., 2005, Vargo; Lusch, 2004, Grönroos, 2000), and a common understanding of the actual relationship between concepts of service, product, good, process, and customer (Laine et al., 2004). However, there are two widely accepted statements about services:

1. Customers play a crucial role for value creation in services (e.g. Brady; Davies; Gann, 2005, Ulaga, 2003, Lapierre, 2000, Walter; Ritter; Gemünden, 2001, Grönroos, 2000);
2. Services should be studied using multiple discipline approach (e.g. Spohrer, Maglio, 2010, Ostrom et al., 2010).

Researchers emphasize the significance of investments and effort that industrial companies are making while developing services, but there is no univocal opinion about whether companies get adequate return on these investments (Malleret, 2006, Gebauer et al., 2005, Grönroos, 2000, Oliva; Kallenberg, 2003, Anderson; Narus, 1995). One of the reasons why there are not enough evidences of profitability of industrial services is that the research field of pricing of industrial services is underdeveloped and lacks empirical studies (Indounas, 2009, Lukassen; Wallenburg 2010). Service research has for a long time focused on trust, commitment, satisfaction, loyalty, and perceived quality effects of service strategies, however, monetary effects and metrics required to do related measurements have not been developed (Grönroos in Ostrom et al., 2010).

There are different approaches to pricing in modelling of modern service-system ecologies, coming from different disciplines. Marketing and behavioural science focuses on customer perspective on service systems and takes a value-based view on pricing and quality as a measure. Operations and management science stands on provider positions and measures productivity by cost-based pricing methods. Strategy and learning science look from competition perspective and apply strategic pricing in order to achieve sustainable innovation (Spohrer; Maglio, 2010). Since service research requires a multi-disciplinary approach, it makes sense to combine different approaches to pricing in order to study problems of pricing in the industrial service sector.

Ideas of value based pricing for services are discussed by researchers in terms of output-, performance- and result-based contracts (Ng et al., 2009, Kim; Cohen; Netessine, 2007, Roegner et al., 2001, Lusch; Vargo, 2006). The general logic behind such pricing is to describe value created for the customer using different KPIs in contract. The value-based pricing process consists of two major steps: a value assessment study and the linking of customers' payment and customer actual realized value. However, customer involvement in the value creation process (value co-creation, co-production), complexity of the relationship and importance of relational factors of value make such pricing approach to be challenging, and therefore, relatively unpopular method for services (Ng et al., 2009, Sharma; Copalkrishnan, 2010).

The focus on pricing research should be shifted from actual methods of pricing to the factors that affect pricing decisions and pricing activities that help to arrive to the correct decision (Ingenbleek et al., 2003). Successful pricing model can be seen as an open system (Scott, 2003) where internal features best match the demands of their environments.

The literature provides the following frames for the research of pricing of industrial services:

1. Following the convention for service research, pricing should be studied from multiple discipline views, which means that pricing model should have marketing, strategic, and managerial domains (e.g. Spohrer; Maglio, 2010, Ostrom et al., 2010);
2. The researchers agree that building of comprehensive pricing for services is a challenge for the firm (Mitra, Capella, 1997, Dearden, 1978, Lovelock, 1981, Thomas, 1978, Berry; Yadav, 1996, Docters et al., 2004, Cooper; Jackson ,1989); many authors associate the challenges in service pricing with different aspects of complexity (Cowell, 1984, Mitra; Capella, 1997, Dearden, 1978, Lovelock, 1981, Cooper; Jackson, 1988, Bolton et al., 2007);
3. In order to overcome the challenges with service pricing the researchers suggest developing systematic approach including pricing process with respect of costs, objectives and other service characteristics (Zeithaml et al., 2006, Lovelock, 1992, Avlonitis; Indounas, 2006, Cowell, 1984, Dutta et al., 2003, Bonnermeier at el., 2010);
4. It is essential for service pricing to establish a link between pricing and value proposition (Lusch et al., 2007);
5. The importance of relationships in services necessitates the inclusion relational value components, i.e. trust and commitments, into pricing (e.g. Selnes; Hansen, 2001, Elfenbein; Zenger, 2009, Cornet et al., 2000);
6. Managers should step out of the widely applied simplistic cost-based pricing methods if they want to fully benefit from service developments and receive adequate compensation for the investment that are needed in order to develop and sell services (Tung et al., 1997, Shipley; Jobber, 2001, Gebauer et al., 2005, Jobber, 2004, Morris; Fuller, 1989, Anderson; Narus, 1995);
7. Value-based methods are difficult to design and implement unless entire logic for pricing of services will be changed toward created by services value (Ng et al., 2009, Roegner et al., 2001).

The present paper continues the prior research into the pricing of industrial services done by Reen (2014) and Reen, Windischhofer, and Wikström (2010). These authors proposed new value driven logic for pricing of industrial services, which is built on three fundamental statements:

- The relational component of value provides significant impact on pricing of industrial services. Customer retention, satisfaction, trust, and commitments have direct impact on a company's profitability. Investment in the development of relationships is a profitable business for both the supplier and the customer, and therefore pricing should not only focus on monetary income but also on relational value.
- For the industrial solution that includes services, the subject of pricing is not the solution itself, but the value proposition created for this solution;
- The pricing process of industrial solutions considers all participants of the value creation process and analyses their value.

Systematic combining of the results from data analysis with the theoretical findings revealed four general reasons behind the reported pricing challenges: issues with trust, different aspects of complexity, organizational immaturity as a service provider, and lack of the necessary competences and capabilities. These four reasons have been used as the dimensions for an initial construct for further analysis of the pricing problems, and, finally, the general model has been developed. The model comprises three main components. In order to develop successful pricing approach companies should:

- Adopt value-driven pricing logic;
- Establish pricing process and governance;
- And cope with multiple factors affecting pricing decision.

In order to manage the pricing factors, to collect the needed data, to analyze factors, to make pricing decision, to monitor results and perform corrective actions, companies need a process that eliminates the obstacles presented by the different functions and activities, and helps to handle them in a systematic way (Figure 1).

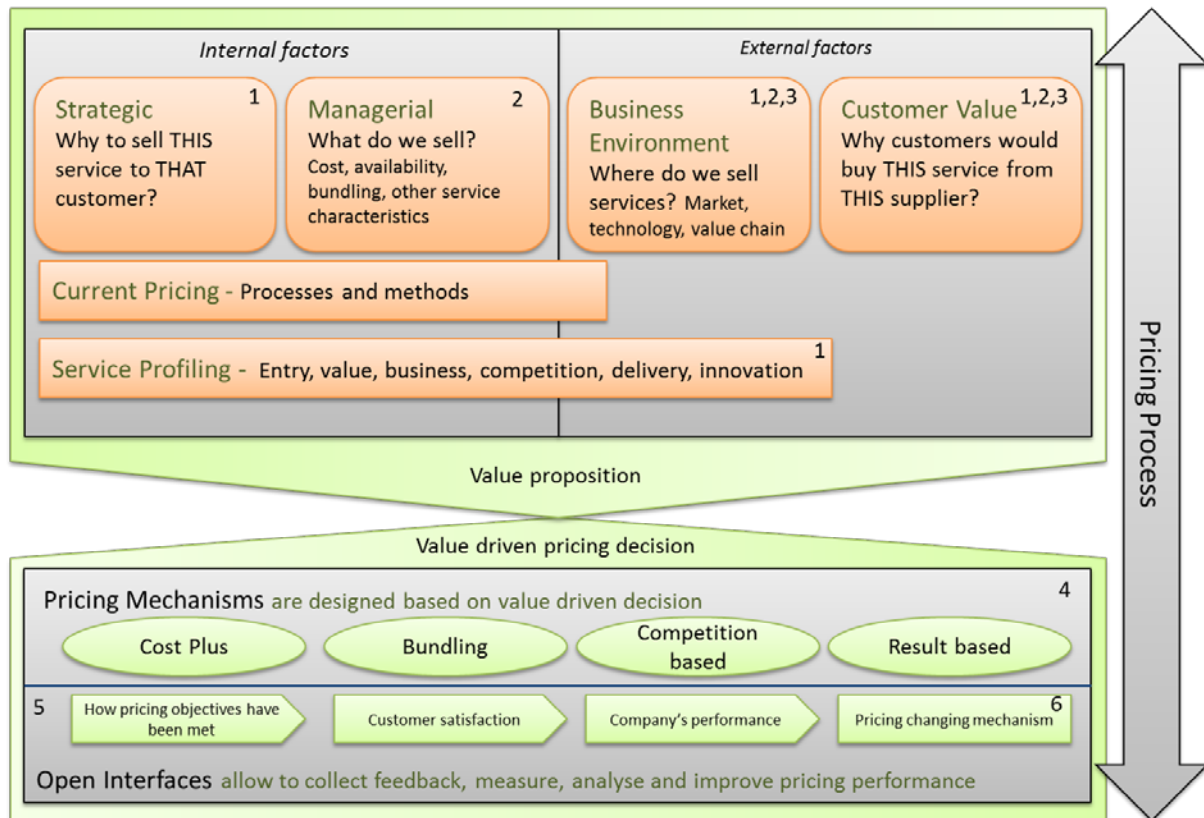


Figure 1. Factors for pricing decision.

3 Research approach and methods

This is a case study that combines data and analysis from different cases. Five organizations have been examined during years 2008–2009 and the last one is an ongoing case that started in year 2013. Such longitudinal approach ensures validity of the research, not the least in terms of topicality of the problems defined.

The data is comprised of qualitative data from interviews and workshops with employees and customers of the case companies, archival data and company reports, business cases, development plans, quantitative data from surveys and checklists, and financial data. The method of analysis can be referred as a systematic combining. It employs abductive matching technique and includes elements of qualitative content analysis, grounded theory, narrative inquire, recursive abstraction methods.

Due to multiple labels that are used to describe development of services for manufacturing companies and the relative novelty of ‘servitization’ research should use a collaborative approach that allow researchers not only be in continuous contact with industry representatives, but also participate in business processes and see the picture ‘from inside’, employing ethnography-like approaches. For example, researchers should see what are norms and factors that affect management decision to select the service for further development and sales, to set up pricing, to process customer feedback.

The research approach of the current paper can be described as follows. There is a new case study (Case T) performed for another industrial company (The Company) that recently started to develop a new pricing strategy. The Company is a large IT service and product supplier. The Company has identified a need to develop value based pricing

and launched a project that aim to identify current problems with the pricing, analyse them, develop a solution, and apply it widely. The project has several stages – data collection, analysis, piloting, and roll out to production phases. 18 interviews with the company's top managers representing all business units, 5 workshops, several regular meetings and 4 customer interviews have been performed in order to collect pricing problems and best practices. Interviews have been performed according to developed questionnaires.

The results from the prior research have been utilized in a following way (see Figure 2):

1. The observations from Case T have been compared with prior research (Reen, 2014, Reen; Windischhofer; Wikström, 2010).
2. The similarity found in interviews and analysis allowed to use a model developed in prior research for the current Case T.
3. The model has been adapted for The Company's context. There are several pilots that aim to clarify and learn more about current problems and possible solutions for The Company's pricing.

The project is ongoing and the results are expected after year 2015. However, the intermediate results, as well as pilots' results, bring a lot of input to the developed earlier pricing model, and demonstrate how new pricing logic can be implemented in practise.



Figure 2. Research process.

4 Empirical part

4.1 Description of Case T

The renewal of the company's management model implied the transformation, which set projects to the core of financial and management accounting and changed the costing and follow-up structures significantly. This major operational and financial change increased threat of revenue leaks.

The Company has performed a study in order to identify, quantify and capture those potential revenue leaks. From an operational perspective seven key improvements areas were identified that either have a direct or an indirect impact to revenue leakages, one of which is pricing. Already at this stage of the research it became clear that company's pricing practices are somewhat inefficient and complex. For example, wrong unit pricing for hours is a significant source of revenue leakages with a total share of 34% of identified leakages. Overall, it was noticed that the pricing process is unclear and there is a lack of customer value view in current pricing.

Data has been analysed and all pricing problems have been grouped into 3 areas that proposed to be work packaged for the next project phase:

- Pricing governance, process and roles;
- New value driven logic
- New pricing enablers, e.g. tools and methods.

In the area of pricing process and governance it was found that the company has neither centralized governance for pricing nor an end-to-end pricing process. Each unit has its own way to handle pricing issues, and though there are some good practices, there is no systematic way of transferring knowledge within the company. For example, one service line has developed solid methodology for setting up internal recommendations for price, but it was not used by other service lines. Some managers are aware about value driven pricing approaches, but lack of guidance and instructions make the development and application of performance based methods impossible.

Regarding pricing logic, it is clear that current pricing practices are cost oriented and a value (both customer and the company) driven approach is missing. Moreover, all the company's support and control functions are developed in order to support a cost-driven mindset and positive cash flow. For example, contracts that would bring benefits in future cannot be accepted as financial control system requires certain approved margin for each deal. The Company is not too successful selling its competitive advantages. For example, customization is sold based on time and material even though it might require the company specific competence and capabilities. Customer relations are not utilized for pricing purposes. There are very contradictive opinions about how pricing should be managed on company levels. One group of respondents think that additional pricing responsibilities should be divided between heads of business units.

Another group thinks that this is close to existing approach and no changes will happen if to continue like that. They believe that The Company should create a separate unit – pricing office that support and enable new way of working.

There is no pricing strategy (or when people discuss pricing strategy, they are talking about different concepts) nor common terminology. Attempts to develop good strategy in pricing are often challenged by existing frame agreement. Pricing is seen as an internal issue; it is not common to ask why customers buy from The Company. Often the only applied strategy is to sell the same solution to everyone and apply the same pricing.

The Company is by tradition a low risk tolerance firm, which makes it impossible to develop value-sharing models since it implies risk sharing with the customers, and risk will increase.

The development of value based methods in pricing is challenged also by fragmented knowledge in customer business. It is sometimes so that The Company knows even better than the customer about overall industry rules and practises. However, there is a lack of knowledge about how customers in practise are using the company's services and products. Moreover quality criteria are not developed toward end users.

There is a lack of tools and methods needed for value driven pricing, such as a value quantification tool, a market price database, price efficiency analyzers, and customer needs profiler.

It seems that competitors are better not only in terms of price level, but in general flexibility for pricing. Asian companies can and are willing to offer similar products at lower prices and taking more risks and responsibilities for the end results.

Customers are in general positive about the company's services. They definitely appreciate attempts to develop value driven strategy, but they believe that The Company should learn more about the customer's business, to take quality from an end user perspective and to be ready to share risks with customers.

4.2 Analysis

The analysis of all data including internal and customer interviews, materials from workshops and preceding project results, revealed that there is no single reason for insufficient intelligence in pricing. The problems with pricing belong to different domains, and therefore to the different company units.

The challenges and observations from prior research and Case T have been summarised according to the certain areas related to pricing and compared as it shown in Table below (see Table 1).

Table 1. Summary of challenges and findings from prior research (Reen, 2014, Reen; Windishhoffer; Wikström, 2010) and Case T.

Area	Prior research	Case T
Pricing strategy	The pricing mechanism, which should support a certain strategic goal, lacks input data for further development. There is a need to clearly define goals for selling certain services to certain customers (why do we want to/need to/can sell this service to a certain customer).	Often strategy is to sell the same solution to everyone and same pricing. Pricing is our internal issue, we don't ask why customer buy from us. People understand by pricing strategy different things. The company does not have clear and formal links between company strategies and pricing methods.
Offering scope	It is important to identify major service characteristics such as costs, innovations, risks, availability, modularity, customization, standardization, and to define service deliverables, as well as to communicate value in terms of customer's needs.	The company needs to improve offering development process, to create generic concept of product structure, to use the same tools and methods for calculating costs of components, market price benchmarking. It is needed to educate people about value selling.
Contract development	It is of paramount importance for the supplier to understand the customer's business logic, and yet create transparency by inviting the customer into the process of designing a pricing mechanism. The supplier and customer define together measurable performance targets by identifying what affects performance and what can be measured. The supplier fails to communicate the value of the service to the customer due to a lack of transparency in the offering, lack of faith by the supplier to deliver on promises.	We should be open with customers regarding pricing. We have very different views and customer business awareness depending on industry. It will be big effort to convince customers that we are capable to develop value based models.

Area	Prior research	Case T
Pricing approach	There is a lack of knowledge and experience in service business in general, and innovative service marketing methods in particular.	Sales are not ready for value-based pricing; they should be educated, The Company's support functions should really support it.
Measuring of pricing efficiency	Performance enhancing effects are difficult to prove and measure due to complexity and lack of sophisticated data gathering and measurement techniques.	It is hard to determine the company's impact on customer performance in order to get a share of it. Should be agreed on level of contribution to enhanced performance and how to share risks.
Price change	The Change Management Phase is often ignored in pricing issues, which makes the pricing outdated in terms of the changing business environment, such as new strategic objectives, new competition, changing service scope, or overall market conditions.	Existing long term frame agreements limit proper reflection of strategy in pricing approach.

Thus the analysis revealed the similarity of the problems and needs of pricing that have been discovered and discussed in prior research with the problems and stimuli toward new pricing strategy development of Case T.

4.3 Results

The distribution of the problems with pricing in Case T across company functions, the similarity of the problems with referred prior research (see Table 1), such as lack of value view in pricing approach, lack of pricing capability in the company, complexity of value-based contracts and others, allows us to suggest using pricing model, developed in prior research, for the Case T purposes. The model comprises of three main components – pricing process, factors, and logic.

Though The Company does not have end to end pricing process, the adaptation of six-step generic process developed in prior research does not seem to be a difficult task. However, the main challenge is to determine and nominate ownership for the process. In other words, governance model that assumes new centralized unit, proposed for pricing management tasks, has been challenged and received a lot of different feedback. The main challenge is that centralized unit does not fit into current decentralized organizational structure. Management expressed a belief that each industry-based division has its own pricing practises and methods and thus unified pricing methods and processes are not able to reflect specific market conditions. However, many researchers (e.g. Dierickx; Cool, 1989, Dutta et al., 2003) see pricing as a capability, which is difficult to imitate and which can bring unique competitive advantage for firms. Developing such a new capability as mastering of value based pricing requires clear roles, responsibility, and ownership in order to manage all aspects of complexity, novelty and uncertainty. Technically new capabilities should comprise of new process, methods, as well as new tools and instruments that should help, for example, to quantify customer value, to provide the best view on market prices, to suggest the best discounting policy, and to analyze customer relationship strength.

Factors that affect pricing decisions are subdivided into internal and external factors. Such subdivision is mainly driven by different management practices, is applied to internal and external issues, and lies behind the organizational structure. On a general level, the analysis of internal factors affecting pricing, both strategic and managerial, reflects the supplier's ability to develop and deliver services. The analysis of external factors, the business environment, and the customers, reflects the supplier's ability to compete with services and correspond with customer needs.

The model (see Figure 2) has been applied and adopted for CaseT in terms and conditions of The Company context and processes and visualized as it is shown on Figure 3.

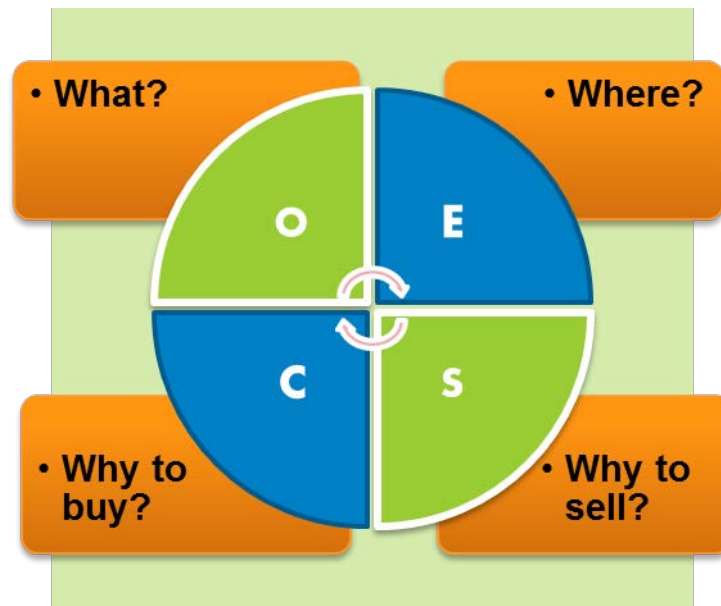


Figure 3. COSE model – Customer, Offering, Strategy, Ecosystem.

Cost based approach dominating in the company put focus on resources, costs, and other service characteristics that affect cost of development and delivery. Other factors related to corporate strategy, customer value and need, and ecosystem were omitted or entirely ignored for pricing decision. At this point it is not clear how should be the proportions of these segments be derived from business context, but indeed they should be harmonized and serve the best and justified results of pricing decision.

One of the most important tasks in order to develop and implement new pricing strategy is to develop and apply value driven logic. It implies designing and adaptation of new principles of value driven logic in pricing for organization, to withdraw from widely dominated cost-based practises, to ensure that other related processes and functions are also involved and support new logic. This is again an argument toward establishing a dedicated organizational unit that would develop and perform all needed for such transformation capabilities.

4.4 Pilots

The main ideas with pilots were to get a concept proof on smaller scale and with minimised risks, to learn more in-depth certain business cases and apply for them new pricing methods, e.g. to perform “an evolutionary” and incremental changes in pricing strategy. The overall expected business benefits from pilots were:

- To achieve savings and earnings on knowledge creation by reduction of percentage of repeating of creating of existing knowledge from 20% (average in industry) to lower and by increasing knowledge base and developing unique competences and new capabilities related to pricing that can be even sold;
- Savings on purchase of needed tools for pricing process by developing current best practises into tools and making justified decision on which pricing tools still needs to be bought – selected subcontractor has pricing tools that can be adopted for the company needs;
- To see immediate results and feedback from pilots, no need to wait for one year when new concept will be roll out to production; therefore, the concept can be updated and the company will learn from mistakes on smaller scope.

There is a list of approved pilot cases (see Table 2) with their own goals, input for pricing model and context.

Table 2. List of pilots.

Case	Goal	Input for the model
Customer 1	To clarify tools and methods needed for making result based contracts, to productise existing best practises	Specification for tools and methods: cash, revenue, risk scenario simulation; method of KPI co-creation; estimating and negotiating impact level on service performance, measure KPIs with customer
Service line	Internal pilot, to adjust existing best practices of pricing process for other units and offerings	Unified in-house developed method for recommended price, full stack concept for offering structure
Customer 2	To develop pricing intelligence for one customer, to create first VB contract with this customer	Mapping of different pricing logics to offering; models with value sharing KPIs
Customer 3	To be innovators in pricing in Financial sector	Industry specific value-based contracts
Customer 4	To learn how to mitigate shared risks	To create methods of managing shared risk in value-based contracts
Customer 5	To get higher cash flow from big deals	New earning logic
Customer 6	New types of contracts – higher involvement to customer business	To develop relationship into element of pricing model
Customer7	To develop value-based selling capability	New selling capability

4.5 Summary of results from pilots

Piloting is the current stage of Pricing Strategy project and the results are intermediate. However, additionally to the expected outcomes and planned goals the pilots provided a lot of food for thoughts that has to be processed and utilized for new pricing initiatives.

There are contracts that include KPIs and the goal of pilots was to learn best practices about existing approaches, conceptualize knowledge and distribute to the whole company. Thus the pilots should contribute to developing of generic KPI based pricing models and to collecting of requirement specification for the required instruments. The important deliverable is a developed process of defining, evaluating, and selection of KPIs for contract.

The pilots revealed additional challenges with value based pricing. KPIs that have been used in the contracts were not actually performance sharing KPIs. They were more or less quality KPIs that regulate bonus/penalty system, exploited for the contract. The customer refused to share gained performance since according to their opinion the company would get too much, and the similar services could be obtained from other suppliers with traditional cost-based model for pricing, which seems to be more beneficial for the customer in this case. In practise, when The Company proposed the contracts with “mixed” pricing approach (there is a fixed price plus quality KPIs) some customer expressed a concern that fixed part already has a profit margin. In fact The Company does not carry any additional risks. From the customer point of view to pay extra from shared benefit only makes sense if risks are shared. However, fixed part of mixed contracts decreases the risks for the supplier, not for the customer. Why the customer would share the results with the supplier if the risks are not shared?

Another disadvantage was in difficulties to define high level use cases for pricing tools. Account team members have worked according to the established cost based processes and performed well according to them. They don't have any needs for new tools and methods, or they didn't see these needs. Only few enthusiastic persons were able to guide pricing project toward certain tools, such as portfolio efficiency measurements, cash flow and revenue simulators.

One of three of The Company's service lines in order to systematise offerings and develop unified approach to cost calculation and market price benchmarking developed internally the process and tools for so-call price recommendation. The goal is to calculate costs of offering components in a similar way, benchmark components and solutions with other similar offerings, and create price notification for sales teams. In order to apply these process and methods to other service lines, it is necessary to have the same view on product and service structure in all the company units. The concept of “full stack” solution, used in the piloted service line can serve this goal. In practise, the several attempts to leverage full stack solution for other business unit have failed. Technical experts from both units don't see any technical

problems to do that, though there wasn't any technical document how to do that. But the problems seem to be on organizational level, despite on optimistic attitude of pilot participants.

The conclusion has been made that there is a need for centralized pricing governance that this kind of important initiatives would not be only intentions; there should be an authority to make it happens and provide needed support. It was decided to propose a separate project in order to find resources, mobilize people and have decision making process. After full stack concept will be applied widely a pricing pilot will be resumed in order to improve recommended price method, and redirect it toward value driven approach.

In the forest industry development of value sharing contracts is ongoing issue. The main driving force from customers to develop such contract is high level on uncertainty and risks in their business. Even new customers are willing to make result based contracts (which is rather unusual since such contracts often require high level of trust). The main competitive advantage of The Company in this area is deep knowledge of business context and local presence. However, the obstacle is traditional conservatism of forest companies, which makes the process of changing pricing models slow and uncertain. However, there are ideas and prototypes for value sharing contracts in the area. The company has deeply studies customer operations on customer site, and offer services that can optimise customer business. This is definitely a candidate to develop value-based sharing model. Customer benefits, such as cost savings, logistic automation and simplification have been quantified. Currently it is important to evaluate potential KPIs and select manageable amount of KPIs for contracts and achieve on that mutual agreement with the customer.

The last at this point but not the least comment from pilots is about the scope of supplier responsibility. Sharing value based contract should imply high supplier responsibility for the end result. In practice it might mean that quality criteria should be developed based on end users' criteria, e.g. if the supplier is providing part of the customer e-mailing system, quality should not be described as availability of certain mail servicers, but ability of system end users sent and receive e-mails.

5 Conclusions

There are internal and external stimuli that create needs and pressure for industrial companies to move away from cost-based pricing approach toward value driven strategy in pricing.

One of the external stimuli is competition. Cost based pricing focuses competition on low costs, rather than on actual service value. This creates disadvantages for both, the customers and the suppliers. The suppliers aim to decrease own cost of production instead of looking for the opportunity to create additional mutual value for themselves and for the customers. The customers are not able to recognize potential and future value of the services when justify their purchasing decision purely on price level.

Another external stimulus is co-creation. In industrial sector there are emerging business models when the customer and the supplier together create a certain product and service. The level of involvement and impact on each other business are already used as KPIs for value-based contracts. For future research it would be relevant to through further case analysis identifying different categories of KPIs connected to different types of business context as a basis for value benefits and sharing targets in contracts.

Higher risks in business environment require development of result-sharing contracts. Customers want to get guarantees for the end results by sharing risks with the suppliers in uncertain situation. This is especially valid for new relationships. In mature relationships trust can mitigate risk levels to some extent. New customers require more "tangible" promises in their contracts.

It is sometimes more difficult to recognize internal stimuli for moving toward value driven strategy. Specialists, sales and offering managers are working according to their processes and routines, and typically don't realize any needs for changes and new approaches. On the strategic level it is clearer that in order to increase win rate and reduce revenue leakage some development should be done in pricing area as well. However, there is no univocal opinion how to do that, what exactly should be done, and who is responsible for new pricing strategy. Responsibilities and roles create additional challenge on the way to develop value based pricing. Traditionally, pricing responsibilities were within sales and product teams due to high dependency to the service cost structure and the fact that actual price discussion with the customers happens during bidding phase. However new value driven approach requires new capabilities, e.g. new methods, tools, and competence. These capabilities should be developed and delivered across the company in all units, and thus should be managed centrally, especially during transition period. Otherwise, there is a very high probability that without centralized ownership the process of value driven pricing will not be taken in use due to complexity, lack of clear instructions, lack of systematic knowledge in value driven approach, and low priority compare to "low hanging fruits".

Industrial services, as well as services in general, imply close relationships and have been widely conceptualized based on value co-creation processes. However, pricing of services entirely omit relationship elements in existing models. There are obviously other difficulties on the way to develop value driven pricing, such as complexity of industrial service context, immaturity of industrial service organizations, and a lack of needed competences. However, the main obstacle on the way to break through from cost dominance in pricing methods is a lack of value driven logic in organizations, which is visible through redundant risk management processes, simplistic sales teams performance measurements, rigid financial control systems, and cost oriented organizational structures.

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Implementation Prerequisites of Electronic Procurement of Services

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Service procurement is a business function of increasing importance, is highly suitable for integration of electronic support, but suffers from severe research deficits. As yet, implementation prerequisites of electronic procurement of services are obscure and not quantifiable at all. In this research project, organisation, formalisation and specialisation of procurement and standardisation and strategic importance of the procured services are identified as relevant implementation prerequisites. Measurement models for these prerequisites are established and quantitative-empirically proven. As such, this paper is a major step towards a more rigorous investigation of electronic procurement of services.

1 Introduction

Service procurement is a business function of increasing importance (Hallal et al., 2010; van der Walk, 2008). At the same time, procurement is highly suitable for integration of electronic support (Wu et al., 2003). In contrast to this, questions of service procurement suffer from severe research deficits (van der Walk, 2008; Bals, 2008; Lavie; Miller, 2008; Bensch; Schrödl, 2011; Reuter, 2013).

This lack of scientific studies in service procurement is confronted by the research project on hand, which concentrates on the organisation structural and service-related implementation prerequisites of electronic procurement of services. This research project is situated at an interface area between procurement, innovation and service research, integrating aspects of business informatics as well.

Furthermore, a clearly defined research framework and clearly operationalized dependent and independent variables are the prerequisites for empirical testing of assumptions. Suitable operationalisation implies the existence of statistical measurement models. As yet, no such measurement models exist for the implementation prerequisites of electronic procurement of services.

Therefore, the main objectives of this research project are twofold: First, to identify the organisational structures within a company which seem to be relevant for the implementation of electronic procurement of services from a theoretical perspective. And second, to establish and validate measurement models which allow testing for the connection between these organisational and service-related structures and the implementation of electronic procurement of services from a quantitative-empirical perspective.

The actual implementation of information and communication technology (ICT) in the procurement process leaves much to be desired (Quale, 2005). Improvements can only be achieved if a so-called "internal customer satisfaction" (Croom; Brandon-Jones, 2007: 295) with the (potential) implementation is reached. Ellram and Zsidisin (2002) propose that the degree of closeness between the purchasing company and the (potential) subcontractor strongly determines the tendency to use electronic procurement. This means that purchasing partners who implicitly trust each other are more likely to use electronic procurement of services. Kumar and Chang (2007) analysed the cost savings potential of reverse auctioning. Rajkumar (2001) for example elaborated on the importance of system integration for electronic procurement and concluded that the ICT systems of purchasing company and subcontractors have to be compatible for successful electronic procurement implementation. Emphasizing a more theory-based approach, Bartezzaghi (2007: 195) proposed that "it is necessary to consider the state of the art in innovation adoption and diffusion models, with a specific focus on ICT" in order to explain electronic procurement implementation.

All in all, purchasing of services is not adequately investigated in literature (Azadegan; Ashenbaum, 2009; Bensch; Schrödl, 2011). Especially under-researched is business-to-business service exchange (van der Valk; Wynstra, 2012). And electronic procurement of services is even less well studied (Reuter, 2013).

2 Theoretical Foundation

The resource-based view (RBV) (Collis, 1991; Grant, 1991; Barney, 1991; Hamel; Heene, 1994) is the theoretical foundation of this research project. Basically the RBV is apt to analyse procurement processes (Mol, 2003). But the RBV consists of many different research perspectives. Therefore, it has to be made clear which of these perspectives are basic to this research project. In order to understand how a company is really working, intimate knowledge of organisational processes is crucial (Levitas; Chi, 2002; Rouse; Dallenbach, 1999). Therefore, the process-oriented perspective (Foss; Stieglitz, 2010; Gavetti; Levinthal, 2004) is chosen as analytical lense.

Furthermore, the access to external resources has a direct influence on strategic decision-making within a company (Gilbert, 2005). This holds especially true as the resources of the purchasing company and the external resources from subcontractors and intermediaries are vital for the whole procurement business. However, cross-company resource

requirements are often conflicting with internal needs (Easton, 1994). Hence, the importance of relational aspects (Lavie, 2004; 2006; Freiling, 2008) has to be acknowledged. Reuter (2013) for example offered insights into electronic procurement of services from a relational resource-based perspective. Relational resource-based perspective in this case depicts the integration of the relational view (Dyer; Singh, 1998) into the resource-based view (Lavie, 2004). This line of theory integration is especially apt as purchasing and supply management research is, at the moment, not able to provide insights into the management of subcontractors as external resources (van Weele; van Raaij, 2014).

Azadegan and Ashenbaum (2009), for example, developed a four-category schema of electronic procurement of services publications. This research project is part of the second category as it focusses on electronic procurement application users. The precise research question which is answered in this paper is:

Which prerequisites can be identified for the implementation of electronic procurement of services?

Two different approaches serve to answer this research question. First, organisation structure is analysed in order to find relevant implementation prerequisites. Second, the special nature of services is taken into account. Theoretically founded constructs and variables are derived in the following two subchapters. The hypotheses are constructed as correlation hypotheses (Bortz; Döring, 2005).

2.1 Organisation Structural Implementation Prerequisites

In resource-based argumentation, organisational capital is a resource which encompasses reporting, planning, controlling and coordination systems (Barney, 1991; Brynjolfsson et al., 2002). Lev and Radhakrishnan (2003) see organisational capital as an agglomeration of technology, business practices and processes and their actual implementation. Bozbura and Beskese (2007) focus on the influence of organisational creativity on organisational capital. To sum this up, Burns' and Stalker's statement is still true: „There is no single set of principles for 'good organisation', an ideal type of management system which can serve as a model to which administrative practice should, or could, in time approximate" (Burns; Stalker 1995, xxi). However, the organisation structure of a company is an important component of the procurement function within this same company (Lambert; Knemeyer, 2007).

The company specific organisation structure directly influences scale and scope of innovative action within a company and has a strong influence on the implementation and the extent of application of electronic procurement tools (Reuter, 2013). Hence, the innovation orientation of a company can be perceived as structure dependent. Organisational structures influence capabilities, motivation, orientation and attitude of employees. The organisation structure shows furthermore if the company has adaptive capacities and if the employees are able to implement new ideas (Thompson, 1965). "A firm's [...] norms, guidelines, databases, organisational routines and corporate culture, as well as its strategic alliances" (Férrandez et al., 2000, 82) are understood as organisational capital. Furthermore, a firm's sustainable competitive advantage depends on this organisational capital (Makhija, 2003). Organisational capital consists of different structural dimensions. Centralisation, formalisation and specialisation are very important in this context (Jansen et al., 2006).

A lot of companies organise procurement in a centralised way within a specific procurement department (Axelsson; Wynstra 2002). The head of the procurement department is part of the firm's management team and the procurement experts within the procurement department are human capital of the firm (Axelsson; Wynstra, 2002). The employees' direct influence on strategic procurement leads to easier implementation of new ideas which in turn enhances the innovation potential in procurement (Hull; Hage, 1982). Especially in the implementation of new technologies and software solutions, learning effects show. From a financial perspective, centralisation is beneficial as well. Centralised procurement improves the bargaining position of the firm. Demand bundling allows better procurement conditions in general and discounts in software procurement in particular (Brandel, 2010).

Hypothesis 1: Organisation of procurement is a relevant construct in measuring organisation structural implementation prerequisites of electronic procurement of services.

Employees do their work in accordance with the roles ascribed to them (Hage; Aiken, 1967). Roles are understood as "standardized patterns of behavior" (Katz; Kahn, 1978, 43) which are related to their underlying function (Sine et al., 2006) and clearly describable (Hickson, 1966). The more specific a certain task – such as electronic procurement of services – is, the easier it can be unambiguously described. Task specificity can be described as the basis for role description.

However, a low degree of formalisation in role description leads to confusion and disarray which in turn gives rise to role ambiguity (Sine et al., 2006). In a formalised organisation structure, each employee knows what to do (Mintzberg, 1979). This simplifies decision making (Sine et al., 2006) and organisational learning. Organisational learning and sustainable development both depend on tasks, rules, methods and orders that are put into writing (Child, 1972). All in all, role description is an important part of organisational capital (Black; Lynch, 2005) and facilitates electronic procurement of services.

Formalised rules are part of the organisation structure (Pugh et al., 1963). Rules adhere to the accomplishment of certain tasks (Dalton et al., 1980) – such as electronic procurement of services – and describe the extent of routine behavior in these tasks (Child, 1972). Also, task specificity increases the formalisation potential of rules. The more specific the task 'electronic procurement of services' is, the easier it is to define rules which are relevant to all tasks of

this specific nature. To abide by these formalised rules is vital for the viability and operability of a company (Hage; Aiken, 1967).

Hypothesis 2: Formalisation of procurement is a relevant construct in measuring organisation structural implementation prerequisites of electronic procurement of services.

Specialised employees are important resources of a firm. Organisations learn from the experiences their employees have made in former electronic procurement assignments. Especially in electronic procurement of services, specialisation of employees is crucial for the efficiency of the procurement process as the knowledge basis expands and the number of specialists rises as well. The more employees of the procurement department are specialists in electronic procurement of services, the higher seems to be the importance of electronic procurement of services within this firm (Reuter, 2013).

Hypothesis 3: Specialisation of procurement is a relevant construct in measuring organisation structural implementation prerequisites of electronic procurement of services.

2.2 Service-Related Implementation Prerequisites

Constitutive characteristics of services can lead to notable differences in the implementation of electronic procurement of material and services. Procurement of services needs more information on the services-to-be-procured than procurement of material (Oman, 2008). The consideration of service-related aspects is a major success factor in procurement of services (Large; König, 2009).

The degree of standardisation of services determines if the services-to-be-procured can be adequately compared with each other. In spite of numerous examples of service standardisation efforts, efficient, practically relevant approaches were not to be seen in the past (Segev et al., 1999) and are still rare now (Reuter, 2013).

Before services can be procured electronically, their standardisation degree is clarified. The most important question in this respect is if the service is standardised. If yes, the degree of standardisation can be identified. The higher the degree of standardisation already is, the more efficient the self-same service can be procured electronically without further amendments. In this case, the describability of services plays an important role. Describability determines if the service is procured externally or produced in-house in the first place (Holcomb; Hitt, 2007). The risk of potential inefficiencies caused by inadequate description of services is minimized if highly standardised services are procured (Ancarani; Capaldo, 2005).

If not, the degree of standardisation is zero. Then, standardisation potential is sought after. The higher the standardisation potential, the better are the chances to successfully procure the self-same service electronically. The employees in the procurement department can identify the services with the highest standardisation potential. In order to generate such a service ranking, the employees have to know the services in question really well. Otherwise, misunderstandings are preprogrammed. In the worst case, such a misreading can result in the procurement of services which do not meet the quality standards of the procuring company. Or the company who wins the bid (in case of an electronic auction) is not prepared to produce the offered services in the relevant time-frame because of time-consuming adjustment necessities (Reuter, 2013).

Hypothesis 4: Standardisation of services is a relevant construct in measuring service-related implementation prerequisites of electronic procurement of services.

The above-mentioned constitutive characteristics of services determine the degree of strategic importance of the services in question (Daub, 2009). The higher the strategic importance of a certain service is, the lower seems the incentive to procure this self-same service externally. Concurrently, if the extent of external procurement of a service is low, the utilization of electronic procurement is even more improbable. The strategic importance of services (Aurich et al., 2010) seems to be another viable implementation prerequisite of electronic procurement of services.

Hypothesis 5: Strategic importance of services is a relevant construct in measuring service-related implementation prerequisites of electronic procurement of services.

3 Empirical Methodology

Measurement models for the different variables are created. The measurement models are based on reflective, multi-dimensional constructs (see Figure 1). In the following subchapters, these measurement models are refined and quantitative-empirically proven.

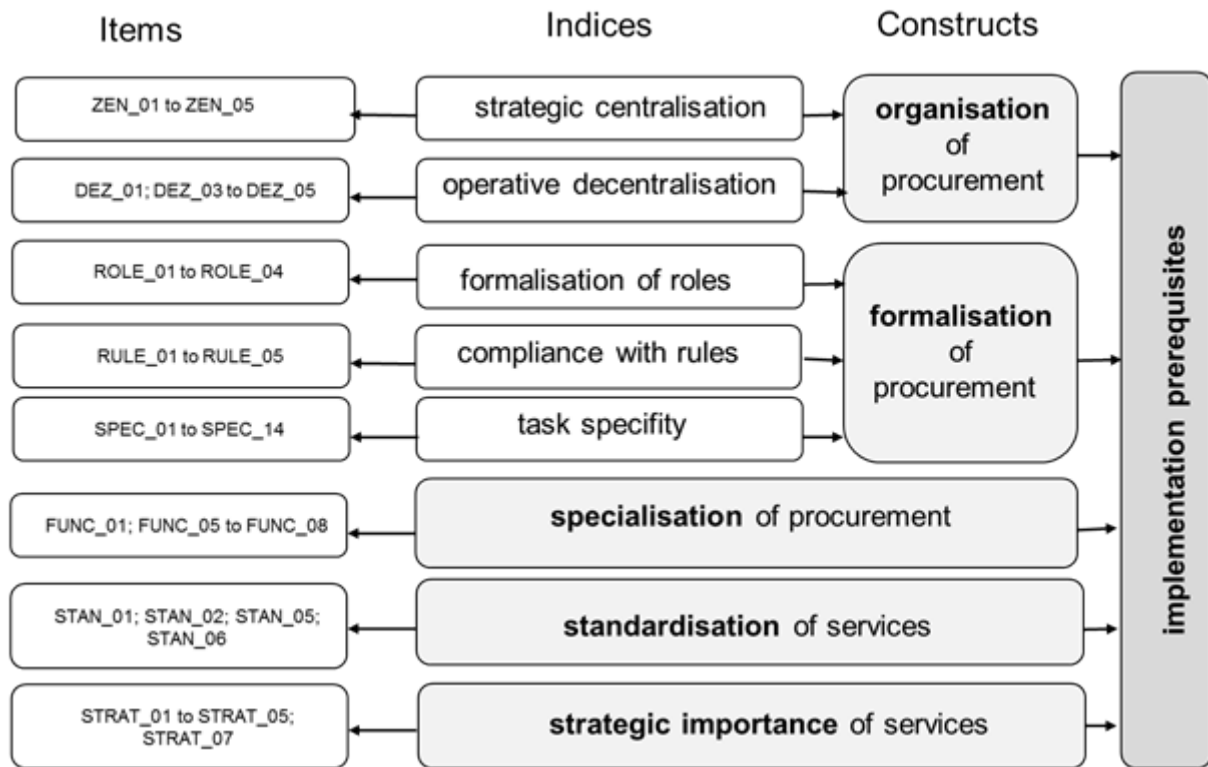


Figure 1. Measurement models.

3.1 Operationalisation of Constructs

Table 1 provides an overview over the constructs which represent the organisation structural and service-related implementation prerequisites in the hypotheses.

Table 1. Operationalisation of constructs.

construct	indices / items	derived by	reliability proven by
organisation	strategic dimension of centralisation	Hage; Aiken, 1967; Pugh et al., 1968	Dewar et al., 1980: Cronbach's alpha 0.92
	operative dimension of decentralisation		
formalisation	formalisation of roles	Dalton et al., 1980	
	compliance with rules	Hull; Hage, 1982	
	task specificity	Aiken; Hage, 1968	Dewar et al., 1980: Cronbach's alpha 0.76
specialisation	number of specialists	Pugh et al., 1963; Child, 1972	Sine et al., 2006: highly reliable
standardisation	describability	Holcomb; Hitt, 2007	
	functional specificity	Ancarani; Capaldo, 2005	
strategic importance	rarity	Barney, 1991	Poppo; Zenger, 1998: Cronbach's alpha 0.82
	value	Aaker, 1989; Coyne, 1986	Nothnagel, 2008: reliable
	imitability	Nothnagel, 2008	
	substitutability	Coyne, 1986	Nothnagel, 2008: reliable

As a rule, all indices are built from several items (Curtis; Jackson, 1962). Furthermore, all underlying items are adjusted to the context of procurement of services.

3.2 Preparation and Execution of the Survey

Previous to the execution of the survey, a reliable method of data gathering was found, the relevant population was identified, the random sample was drawn and a preliminary survey was carried out. According to Deutschens et al (2006), an online survey is as reliable as any postal survey. Therefore, data gathering was executed online. Zikmund (2000) characterised the relevant population as a group, whose participants share commonalities, which are relevant for a certain statistical examination. In this case, the relevant population was the group of all facility management service providers in Germany. The exact number of participants in this group could not be distinguished. Therefore, a random sample was drawn from several sources. Hoppenstedt database, recent market studies of the German journal "Facility Manager Magazin" and the so-called 'Lünendonk-Liste' were exploited. In addition, the members of the German "Qualitätsverbund Gebäudedienste" were integrated as well. Thus, 1.048 facility management companies in Germany were identified as relevant members of the random sample.

During the actual survey, the researcher has no possibility to intervene. Therefore, the design of the questionnaire is highly important and the exact meaning of items is extremely relevant in the development of measuring models. Hence, a preliminary survey was carried out in order to rule out any misunderstanding and ambiguity (Rossiter, 2002). As a result, several items were rephrased and the length of the questionnaire was reduced considerably.

The online survey itself took place in May and June 2011. The EFS survey tool was used to carry out the poll. 131 of the companies represented in the random sample completely answered the questionnaire. This is important as the overall response rate determines the representativity of the gathered data (Armstrong; Overton, 1977). The overall response rate was 12.5%. A good deal of quantitative-empirical research in procurement published in international journals sports similar response rates (e.g. Nguyen; Harrison, 2004; Rao; Holt, 2005; Sanders; Premus, 2005; Tracey; Tan, 2001; Frohlich; Westbrook, 2001). Hence, 12.5% are an average, but still meaningful response rate (Röderstein, 2009).

To rule out any unwelcome side effects, the companies which took part in the survey were controlled for company size (Hallal et al., 2010), company age (Aiken; Hage, 1968) and size of the procurement department (Jansen et al., 2006). None of these control variables had a significant influence on particular answers.

3.3 Evaluation of the Survey Results

One prerequisite of reviewing correlations between constructs is the validity of the reflective measuring instruction: „Validity is represented in the agreement to measure the same trait through maximally different methods" (Campbell; Fiske 1959, 83). A valid measuring instruction measures what is intended to measure (Field, 2011) and is situated within the subject area of the relevant construct (Combs et al., 2005). It is the question which items reflect existing correlations the best. An answer provides explorative factor analysis.

Explorative factor analysis is applicable if more than 100 questionnaires are analysed (Hair et al., 2010) and at least four items are used to build a construct (O'Leary-Kelly; Vokurka, 1998). Furthermore, the existence of correlations between items is another utilisation requirement. According to Field (2011), Pearson's r has to be at least 0.3. All three basic requirements are fulfilled for the items in question. Therefore, explorative factor analysis could be used to assess the relevance of the proposed constructs in measuring organisation structural and service-related implementation prerequisites of electronic procurement of services.

Two different manifestations of explorative factor analysis are known: main axis method and main component method. The goal of this research project was to reduce data but to conserve most of the variables variance. Hence, the main component method (Hair et al., 2010) was used. In a first step, the number of relevant components was derived with the so-called scree-test (Field, 2011). Most of the variables could be described through one single component. For those which could not, factor rotation was used (Reuter, 2013). Furthermore, the items' factor loading was taken into account. According to Hair et al (2010), factor loading has to be at least 0.5, if 120 to 149 questionnaires are considered. Therefore, nine items with factor loadings below 0.5 were eliminated.

In a second step, factor analysis was run again with the remaining items only. Factor loadings showed that all items loaded highly on the respective factors: results were all above 0.5. In literature, the interpretation of extracted communalities is inconsistent. Field (2011) labeled extracted communalities of < 0.5 as not acceptable. However, he also indicated that it is up to the researcher whether extracted communality or factor loading is used as decision criterion. Hence, most of the items exhibit high enough factor loading and high enough extracted communality to qualify as relevant. Eight items are relevant for their factor loading alone. The factor loadings and extracted communalities in question are displayed in table 2.

Table 3 gives an overview over the second circuit of explorative factor analysis and its results. The highly significant results of the Bartlett-test show that multicollinearity was evident for all tested items. Furthermore, the suitability of the random sample was tested. The Kaiser-Meyer-Olkin (KMO) criterion is designed to do just that (Hair et al., 2010). According to Field (2011), results of > 0.5 are acceptable. Hence, data showed that the random sample is highly suitable to test the researched hypotheses.

Furthermore, the reliability of the measurement models was tested. Cronbach's alpha was used to illustrate the constructs reliability. Following Nunnally and Bernstein (2008), the results for Cronbach's alpha are considered to be acceptable if higher than 0.6. As all results were considerably higher than this threshold, all (sub-) constructs were

proven to be reliable. The results for both the multi-dimensional and the single-dimensional constructs are displayed in table 3.

Table 2. *Extracted communalities and factor loadings.*

construct / sub-construct	item	extracted communalities	factor loading
strategic centralisation of procurement	CEN_01	0.914	0.956
	CEN_02	0.875	0.935
	CEN_03	0.847	0.920
	CEN_04	0.915	0.957
	CEN_05	0.624	0.790
operative decentrali- sation of procurement	DEC_01	0.310	0.557
	DEC_03	0.812	0.901
	DEC_04	0.590	0.768
	DEC_05	0.749	0.865
formalisation of roles of procurement	ROLE_01	0.785	0.886
	ROLE_02	0.825	0.908
	ROLE_03	0.804	0.896
	ROLE_04	0.266	0.515
compliance with rules of procurement	RULE_01	0.758	0.871
	RULE_02	0.468	0.684
	RULE_03	0.650	0.807
	RULE_04	0.645	0.803
	RULE_05	0.734	0.857
strategic importance of procured services	STRAT_01	0.439	0.663
	STRAT_02	0.381	0.617
	STRAT_03	0.690	0.831
	STRAT_04	0.641	0.801
	STRAT_05	0.374	0.612
	STRAT_07	0.653	0.808

construct / sub-construct	item	extracted communalities	factor loading
task specificity of procurement	SPEC_01	0.594	0.771
	SPEC_02	0.653	0.808
	SPEC_03	0.734	0.856
	SPEC_04	0.740	0.860
	SPEC_05	0.518	0.720
	SPEC_06	0.762	0.873
	SPEC_07	0.768	0.876
	SPEC_08	0.748	0.865
	SPEC_09	0.801	0.895
	SPEC_10	0.612	0.783
	SPEC_11	0.797	0.893
	SPEC_12	0.771	0.878
	SPEC_13	0.661	0.813
	SPEC_14	0.588	0.767
spezialisation of procurement	FUNC_01	0.487	0.698
	FUNC_05	0.488	0.698
	FUNC_06	0.708	0.841
	FUNC_07	0.756	0.869
standardisation of procured services	STAN_01	0.806	0.898
	STAN_02	0.781	0.884
	STAN_05	0.745	0.863
	STAN_06	0.699	0.836

Let us take a look at the organisation-structural implementation prerequisites first. The construct of organisation of procurement featured an average suitability of the random sample of 0.752 (KMO-criterion) and explained an average of 72.496% of the existing variance. Cronbach's alpha ranged between 0.755 and 0.950 which is really outstanding. All in all, organisation of procurement was identified as a relevant construct in measuring organisation structural implementation prerequisites of electronic procurement of services. Hypothesis 1 was confirmed. Formalisation of procurement as a construct exhibited an average suitability of the random sample of 0.843 (KMO-criterion). An average of 67.237% of the existing variance could be explained with the respective construct. The results for Cronbach's alpha ranged between 0.819 and 0.966. Both results were even better than the above-mentioned results. Formalisation of procurement was identified as a relevant construct in measuring organisation structural implementation prerequisites of electronic procurement of services. Hypothesis 2 was confirmed. Furthermore, the results concerning specialisation of procurement also justified hypothesis 3.

Table 3. Explorative factor analysis and results.

implementation prerequisites	construct	sub-construct	explained variance (in %)	Suitability of the random sample (KMO-criterion)	Cronbachs alpha	significance (Bartlett)
organisation-structural	organisation of procurement	strategic centralisation	83.483	0.829	0.950	0.000
		operative decentralisation	61.510	0.675	0.755	0.000
	formalisation of procurement	formalisation of roles	66.981	0.779	0.819	0.000
		compliance with rules	65.119	0.815	0.865	0.000
		task specificity	69.612	0.934	0.966	0.000
	specialisation of procurement		63.631	0.802	0.847	0.000
service-related	standardisation of procured services		75.768	0.830	0.893	0.000
	strategic importance of procured services		52.977	0.775	0.815	0.000

In what concerned the service-related implementation prerequisites, the results for standardisation of procured services clearly indicated that hypothesis 4 was confirmed. A small question mark remained when analysing the data for strategic importance of procured services. The mere results indicated that hypothesis 5 is supported as well. However, the relatively low explained part of the existing variance (52.977% only) pointed out that strategic importance of the procured services was by far the weakest of the researched implementation prerequisites.

To sum this up, explorative factor analysis showed that the theoretically derived measurement constructs were highly suitable to depict the implementation prerequisites of electronic procurement of services. The partitioning into organisation-structural and service-related implementation prerequisite proved to be justified as well.

4 Conclusion

4.1 Summary of Results

Process-oriented, relational and resource-based reasoning identified organisation, formalisation and specialisation of service procurement as relevant organisation structural prerequisites for the implementation of electronic procurement of services within a company. From a service-related perspective, the degree of standardisation and the strategic importance of the procured services have explanatory power for the question of implementing electronic procurement of services.

These five theoretically founded implementation prerequisites were operationalized and statistically tested. Explorative factor analysis identified the items which were apt to describe the constructs. Most of the theoretically derived items passed quantitative-empirical testing with flying colours. The KMO-criterion showed that the used items were highly suitable to measure the random sample. Cronbach's alpha values between 0,755 and 0,966 showed that the built constructs were highly reliable.

All in all, the implementation of electronic procurement solutions of services holds a lot of potential for future use in business-to-business procurement. The construction of reliable measurement models in the research area of electronic procurement of services is a major step towards a more rigorous investigation of this important topic.

4.2 Restrictions and Further Research Necessities

This research project has certain restrictions which should be discussed. The measurement models were constructed with a quantitative-empirical survey within the facility management branch in Germany. This limits the generalizability of the research results. Therefore, the constructed measurement models should be tested again for other branches than the facility management branch and / or within other countries than Germany. This would lead to more generalizable results.

Also, concerning the strategic importance of procured services on the usage of electronic procurement of services, the role of this implementation prerequisite should be further investigated.

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Business Model Canvas as ‘a thought experimentation model’ in search for a service-based business logic

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Abstract

The aim of our study is to look into the meaning of Business Model Canvas (BMC) and of peer group dialogues to learning processes of three Finnish firms participating in a service business training program. We inquire the relevance of these learning tools as mediators for reconceptualize a vision for service business logic. Our study highlights that BMC was 'a thought experimentation model' that oriented the participants towards service logic by classifying and sorting out elements of business vision leaving, however, open how a concept-level and systemic business idea can be conceptualized. Thus peer dialogues and other supplementary tools visualized and materialized the actual transition between the product-based and service-based logic.

1 Introduction

Since the beginning of the third millennium Service-Dominant Logic (S-DL) (e.g. Vargo & Lusch 2004) and Service logic (e.g. Grönroos 2008) have been hot topics in business literature. The focal idea is that offerings intertwining both products and services act as instruments of value creation and based on this idea firms are looking for ways to offer unique value that separates them from competition. The search for a competitive advantage emerges as well in long-term inter- and intra-organizational learning processes as in strategic planning and implementation of managerial decisions and goals. In dynamic business environments collective learning has become a key driver of organizational transformations and, therefore, there is also a need for an expansion of methods and tools of managerial and organizational learning as the complexity of business activity increases (Virkkunen & Ahonen 2007). Furthermore, the improvement of performance demands comprehensive changes in production procedures that in turn highlights the need to integrate the principles of scalability and mass-customization with proactive and agile work that benefits from digital technology and co-configuration with customers and business partners and results in customer-intelligent offerings (Victor & Boynton 1998). Therefore, the formation of a service-based business logic means that the business goal is expanded through concept-level development that is triggered by creation of new tools and exploration of new opportunities from everyday business practices, for example business events, collaborative and partnering dialogues and experiential business actions (McGrath 2010; Ristimäki 2014).

A generalized instrument in business literature and in organizational practices that integrates both strategic and operational business perspectives and conceptualizes the dynamic nature of value creation is the concept of business model (see a review of the concept in Zott, Amit & Massa 2010). Based on the idea that the purpose of businesses is to create value and make revenues from that value. Shafer, Smith & Linder (2005, 2012) have defined it “as a representation of a firm’s underlying core logic and strategic choices for creating and capturing value within a value network”. Our interpretation is that this definition emphasizes a dynamic and systemic nature of business, because the logic of activity refers to the generalized sets of principles and routines prevailing in the organizational reality of organizing and managing business activity. Additionally, the strategic choices are made at everyday level of decision making which Spinosa, Flores & Dreyfus (1997) call “everyday history-making” (see also Engeström 2004). Therefore, we claim that the systemic nature that the concept of business model embeds is not simply related to explication of cause-and-effect (cf. Shafer, Smith & Linder 2005), but to the dialectical relations between different elements of organizational practices that need to be reconfigured when the logic of business activity is to be transformed.

Many recent studies of business models describe, but cannot explain how a comprehensive transformation proceeds, because of lack of empirical evidence on business logic transitions. However, in realities of firms transformation of business models generate tremendous changes in the logic of value creation and in work practices as Victor & Boynton (1998) have presented. Based on longitudinal case studies they have depicted a strategic path in business development and conceptualized it to include five strategically different generic successive logics of doing business and producing products. Also Sosna, Treviño-Rodríguez & Velamuri (2010) show in their case study that the transition from a business logic to another takes years or even decades without permanent, “final” solutions. Thus, in recent business literature the idea of sustainability of business models is related to the transient competitive advantage (McGrath 2013) that for its part is based on ideas such as “strategic agility” (Doz & Kosonen 2008), “discovery driven approach in business models” (McGrath 2010) or “action-based competition” (Madhok & Marques 2014).

2 Focus of the study

In this interdisciplinary study we have adopted the idea of Baden-Fuller & Morgan (2010) who interpret business models as tools that enable business actors to reframe new business solutions and due value-creating constellations with actions of innovating, prototyping and experimenting of new business elements. Here we conceptualize business models as tools that mediate collective learning and strategic business development. Instrumental, visualized application of business models introduces business actors with potential elements of new business model before too much practical effort or financial investments are made (McGrath 2010).

For the analysis of this study we have selected three firms that participated in a training program organized to facilitate the firm's efforts to advance the transformation of business activity towards service-based logic. At the initial stage of the program participants were offered the Business Model Canvas (Osterwalder & Pigneur, 2010; named BMC hereafter) as a materialized form of the conceptual tool of Business Model to illustrate firm's prevailing business logic and a preliminary business idea of an envisioned future. After the first training period of three training days a peer group dialogue meetings were held to support the modeling of their new strategic ideas of service business. The purpose of applying BMC in the beginning of the training program was to enable the business actors to materialize initial business ideas triggered by the first three training days. During these training days the generic building blocks and strategic aspects of service business had been introduced. The discussion in the peer groups was supposed to support the participants in the identification of potential elements in service business.

The purpose of our study is to explore how BMC and peer group discussions work as tools or mediators when contemplating to move from the prevailing business logic to a new one. We examine how service business logic could be explored with BMC in each firm and how reflection and discussion in peer group meetings contributed to the conceptualization of service-based business and supported to "office desk exercise" of making plans with BMC. Furthermore, we elaborate what kind of mediating role BMC model had for the business actors and for their business.

3 Conceptualization of service business logic transformation

The focus in service business logic lies on adapting to and working proactively in changing conditions and with customers' needs, instead of classifying offerings into physical goods and services. According to Edvardsson, Gustafsson and Roos (2005, p.118), "service is a perspective on value creation rather than a category of market offerings". The key notion is that although a customer buys products or services, they are both consumed like services (Grönroos, 1978; Grönroos, 2008; Gummesson, 1995, Vargo and Lusch, 2004). In another words, those goods or services are ultimately bought to serve the customer's processes and to create value in those. Thus, the customer service has been conceptualized as a service logic according to which both goods and services act as instruments of value creation. Therefore, new concept like the digital age concept of "platform" reflects a tendency to conceptualize for example the use value based on collective innovation and continuous learning from and with customers and partners without dichotomous separation of materiality in the product.

In general, when taking an evolutionary perspective for the concept of service the meaning of it has during the digital era expanded from actions in the customer interface towards more comprehensive interpretation of service orientation in business practices i.e. the earning and value creation logic of businesses. Therefore, there is a need for understanding and interpretation of the more complicated business totalities and disengagement from business functions based thinking that originates from mass-production period and that can hinder relevant theorization of service logic of the digital era. We claim that relevant theorization is related to the issue that the principles of service logic contradict the principles of mass production that emphasize internally driven competitive advantage of mass products, cost efficiency, scalability of production and price. Nevertheless, a transformation from mass-production based logic to service based logic is not a transition from the first to the latter, but an integration of the principles of both logics and application and innovation of a novel base for managing value creation and competition. Therefore in this study the transformation towards service business logic is highlighted with an interdisciplinary sense. We take the concept of learning not only as notion to be added to but a theoretical concept entailing also a paradigm of learning and the academic discipline of activity theory with historical and contextual emphasis in the analysis of the data. The business theories and empirical data offer this study the contexts that are interpreted and analyzed.

4 Tools as mediators for learning a service business logic

In an established business, new business logic cannot emerge and become generalized at once. The emergence of a new logic is usually embedded in deviating actions that challenge the prevailing practices and norms. The deviating actions form the „germ cell activity“ for a new logic through which the novel principles are created. Later these new principles can become generalized as the new nature and new forms of business practices. A comprehensive transformation from a logic to another includes a construction of a new systemic entity with new relationships of interaction. Therefore, for finding a new germ cell for business it is focal to critically question prevailing logic and generalized business thinking. Thus, there is a need for new tools that mediate explorative actions and new modes of thinking. The learning of a new logic can be depicted as an evolutionary process that is characterized by interplay between reobjectification and retooling of business activity. New tools as mediators of learning are needed to solve the discrepancy between the

emerging new customer demands or business conditions and firm's prevailing logic of business. New tools bring forth new qualities that cannot be visualized with the tools of prevailing logic. (Virkkunen & Virkki, 2014; Ristimäki, 2014)

Osterwalder's (2004) theorization of the concept of Business Model is materialized in the Business Model Canvas that is a tool for managers to identify their business ideas and the modes of value creation and to characterize a potential value creation logic (see also Osterwalder, Pigneur & Tucci, 2005). For portraying the prevailing business logic and designing potential new components in value creation the researchers have presented a canvas with nine fields of key themes that follow a purposeful order. The model of the BMC is depicted in its original structure in the following picture as illustrated by Osterwalder & Pigneur (2010).

BUSINESS MODEL CANVAS

8. KEY PARTNERS Who are our Key Partners? Who are our key suppliers? Which key resources are we acquiring from partners? Which key activities do partners perform?	7. KEY ACTIVITIES What key activities do our value propositions require? Our distribution channels? Customer relationships? Revenue streams?	2. VALUE PROPOSITIONS How do we help the customer? What value do we deliver to the customer? Which one of our customer's problems are we helping to solve? How do our value propositions differ from the ones of our competitors? How do we measure the value delivered to the customer?	4. CUSTOMER RELATIONSHIPS What kind of customer relationships do different customer segments expect? What kind of customer relationships do we already have? How expensive are they? What are the switching costs involved for the customer?	1. CUSTOMER SEGMENTS For whom are we creating value? What is the main problem of the customer?
9. COST STRUCTURE What are the most important costs inherent in our business model? Which key resources are most expensive? Which key activities are most expensive?	6. KEY RESOURCES What key resources do our value propositions require? Our distribution channels? Customer relationships? Revenue streams?	5. REVENUE STREAMS On what is the price of the products and services based? For what does the customer pay? How do our actions affect the everyday of customers? How do we prove the effect? How would the customer prefer to pay?	3. CHANNELS How are we reaching the customer? Which channels are the most important for the customers? How are telling our value propositions to customers? How are sales organized?	

(Osterwalder & Pigneur, 2010)

Figure 1. Business Model Canvas (Osterwalder & Pigneur 2010).

Viljakainen, Toiviainen & Aikala (ibid.) has extended the BMC model proposing a business model construct that integrates a service logic. They claim that a dynamic presentation of the model calls for highlighting customers and partners role in the components of the BMC model without making the model as a tool for managers not too complicated. Also McGrath (2010) suggests the promotion of outside-in focus as the basic idea of business models in making sense of the strategic aspects of the business. However, McGrath also points to the centrality of the experimentation as »the real business model« can only be discovered in the changing realities of the firm.

Our perspective of BMC model is related to the purpose of the BMC model in the specific context of the training program. We propose that the BMC model was a »thought experimentation model« (Miettinen 2000) that enabled the participant of firms to elaborate a potential working hypothesis for future business actions and to test the hypothesis with their colleagues in the light of the knowledge achieved at that phase of the training program.

5 Data collection, methodology, and data analysis

The description of the training program

The training program including five training periods with three training days in each period started in February 2014 and ends in March 2015. During each of the training days an academic or an expert consultant gives a lecture on the subject at hand and in some of the days also visiting speakers from different firms present case-examples. The training days include a lot of peer discussion among the participants and different presenters. Furthermore, two actors from the University of Eastern Finland take part in the training program. Their role is to facilitate and support the learning

processes of each participant by provoking thoughts, discussion and actions for example by providing different assignments. The BMC was given to the participants as an assignment tool during the first training period that dealt with the basics, strategy and change required by moving towards service business.

Activity-oriented case study approach

In order to study Business Model Canvas as ‘a thought experimentation model’ when moving towards service business, we utilized action research approach and the case study strategy (Miles and Huberman 1994; Yin 2008). In action research the researchers are actively engaged with the research object and work with the participants to develop their business (Eriksson and Kovalainen 2008). Action research is not a method but a systematic approach, a variety of data collection method may be used (Eriksson and Kovalainen 2008). In this study we applied action-research that intertwined analysis of firm’s narratives and peer groups’ collective dialogues with activity-theoretical approach that conceptualize tool-mediation in activity (see Kajamaa 2012). We approach the data as a multiple case study, for which three intrinsic cases were selected from the participants of the training program. According to Eisenhardt (1989, p. 543), case studies have the potential to capture the dynamics of a studied phenomenon and he defines case study as “a research strategy which focuses on understanding the dynamics present within single settings.”

The multiple case approach is employed, since it offers contrasting results from dissimilar fields of business. Thus, more comprehensive understanding on the studied phenomenon may be gained. The unit of analysis is the learning process towards service business in a firm. The selection of the cases to be studied is based on the following reasons. First, the case firms have made an apparent decision to move towards service business. Second, the firms are exemplar on their own industry field. Finally, the selected cases form an ensemble in which contrasting results may be derived. Based on the criterion, three cases were selected to be studied. The first case is the subcontractor for metal plants, the second case is the energy infrastructure building firm, and the third case is the tourism services firm.

Analysis of the data

The analysis of the use BMC model in three case companies and testing the business ideas in peer group dialogue meetings is divided in three phases. First we give a short description of the data of each firm including narrative scripts of the prevailing business challenges and aspects of future vision presented by actors of the participating firms. Thereafter we present our analysis of firms’ business logic and the transformation of logic as presented with the BMC and in peer dialogues and evaluate the use of the tools. Finally we evaluate the mediating role of the BMC model and peer group dialogues for learning. The three companies come from the following industries. In the parenthesis there are the code names used in the following empirical section of the study:

1. Subcontractor for metal plants (Metaloy)
2. Energy infrastructure building firm (Eninfra)
3. Tourism services firm (Touriserv)

In the following figure we have positioned the three firms in a four-field matrix adapted from Storper (1996) that represent business logic as »economies of conventions« that set rules, conditions and generic principles for demand and supply of products and services. Storper calls the different fields with different logics of business interaction as »worlds«. Thus the division between the worlds is based on axioms of supply and demand. The supply is either of standardized or specialized products and services. The demand is for generic or deciated products and services. Thereby, the four-fields are »the industrial world«, »the market world«, »the interpersonal world« and »the world of intellectual resources«. We use this matrix and the axioms embedded in each world to interpret the transformation of the business logic in our analysis of the three case firms.

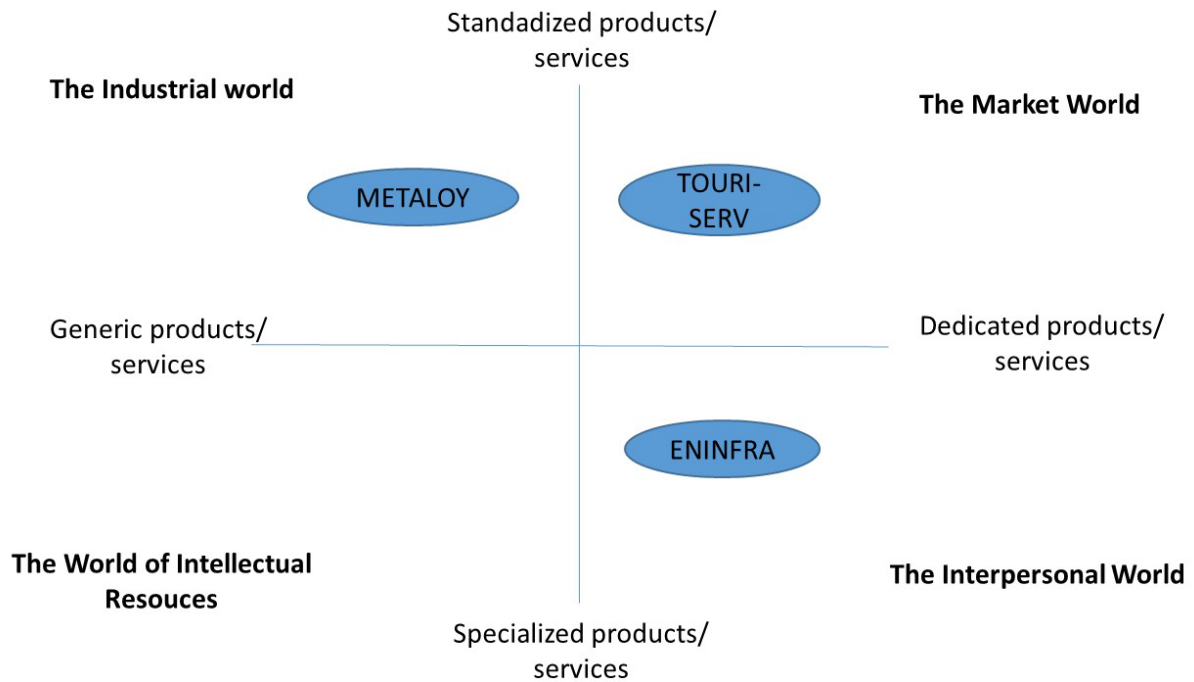


Figure 2. The Case firms in their business logics in the “matrix of worlds”.

6 “Thought experiments” in three case firms

Subcontractor for metal plants (Metaloy)

In the training program participated the CEO of a metal industry subcontractor. First he expressed their prevailing blurred position and indefinite future business position in the markets with the following words:

»We operate in a zone of uncomfot, because we do not have a single product of our own. How do we then servitize our business?«

However, he himself then specified that they are a service firm, because what they offered were services to machinery companies in forms of welding, mechanizing and painting. The analysis of researchers regarding the firm’s BMC reveals that at this »thought experimentation stage« firm’s vision of a new business logic constituted mostly of list and single generic descriptions and qualitative indicators of the object of business activity that, however, formed an entity and direction for the future. This materialized in the formulation of a new slogan for the firm and services clearly named as a guiding elements for a service logic. The new slogan: »METALOY– from parts to ensembles« served as a title that gathered together packaged service that the firm was planning to offer for their customers.

The CEO told that one concept in the training program had evoked him. For him the concept of »hybrid organization« was a clue to a new business model. The notion of hybrid organization had mediated him a new concept-level business idea of becoming a broker the deals with customers’ subcontractors. An illustration of this business idea is presented in the following figure as it was drawn in a additional paper that was included with filled assignment of the BMC model. For the researchers BMC assignment was much easier to interpret with this concept-level visualization of the two business logics – the one of today and the one potential for the future – that Metaloy’s CEO and his colleagues had illustrated in the paper. The picture helped to pull together the systemic nature and principles in the logics and to figure out the singular descriptive notes written in the BMC Model.

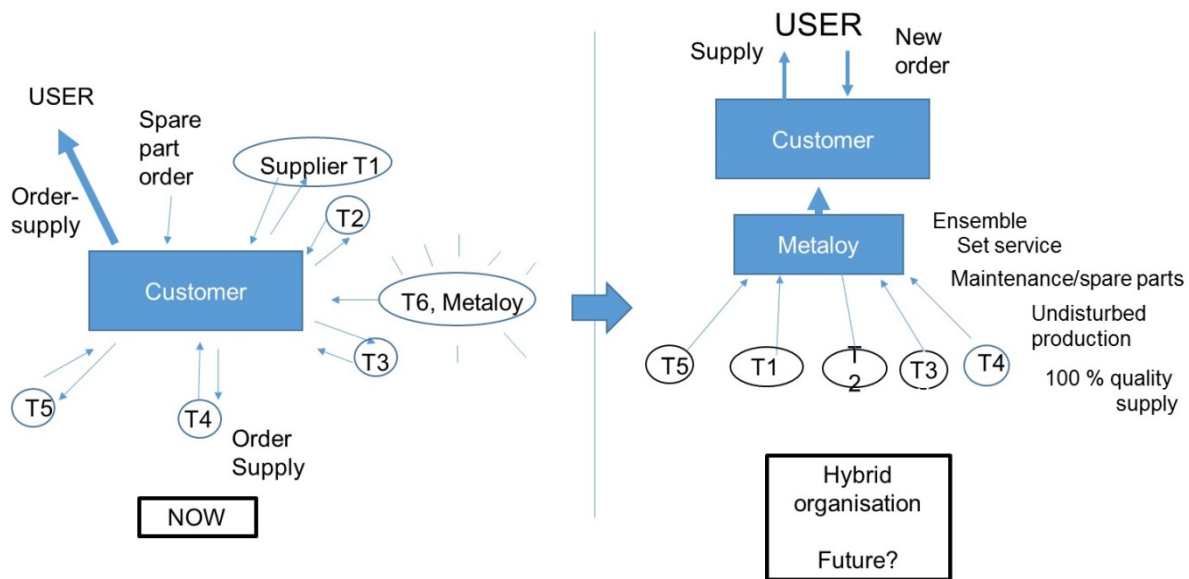


Figure 3. Metaloy's visualization of firm's concept-level transformation towards service-based logic.

Energy infrastructure building company (Eninfra)

There were three participants from the energy infrastructure building firm in the training program. Consequently although they all filled their own BMC and brought their own thoughts in it, it was clearly shown in their writings that they had discussed the matter together. Also in the peer discussion all three contributed to the joint presentation.

At present the firm has few customers and it is heavily dependent on one big customer. They have a history of a close relationship with that customer, but recently the customer has shown a desire to scan also alternative service providers. Due to governmental regulations all the suppliers in the industry tend to offer same kind of products and services which has lead to competing mainly with the price. At this situation it was seen that it is quite easy for the customer to change the supplier. Thus, the focal question presented in the peer discussion was:

»... how could we lead the customer in the direction that it could decide to continue with us and not seek for alternatives...«

The basis and need for the change in the business logic was a need to develop current customer relationships and look for new customers. In line with this, the main theme in the peer discussion related to customer relationship management. Already in the BMCs the three participants expressed the need that in the future customers should be segmented and more effort should be put in managing and developing the customer relationships systematically. It was also pointed out that the formulation of value proposition and how it is expressed to customers should be sharpened. In addition, it was brought up in the BMCs that in the future the perspective of customers' customer and customers' goals and needs are meant to be taken into account better. These were the things that are somewhat lacking at the present.

The peer discussion concentrated on themes such as the meaning of personal relationships and creating stronger bonds with customers. The question »what is the thing that we can offer more than the neighbour« was brought up. In order to find the competitive advantage, the significance of knowing the customer, having customer insight and proactively respond to customer signals was recognised. The representative of the firm said that the change itself forms a challenge in moving towards service business.

»... reaching the understanding in our organization and then starting the change and through that managing it. That is probably one challenge.«

The BMC had been a thought provoker. One of the representatives of the firm said that although the themes brought up by the BMC are »truisms in managing a business«, the questions presented in it made him evaluate the business operations. Answering the questions had stopped him to ponder the issues thoroughly.

Tourism services offering company (Touristserv)

In the beginning of the peer group discussion the CEO of the tourism service firm explained that several changes concerning tourism, marketing and personnel have lead to a need to develop the firm's business logic more focusedly towards service business. The old way of doing business relied on being actively present in different kinds of media, exploiting the tools of mass marketing and thus grabbing the attention of the customers. The value promise given to customers was formulated in the BMC as »one call, get it all«. So after the customers took the initiative to contact the

firm, then it would provide them with easy and quick service meeting all their needs. However, the image of the destination was seen to limit the spectrum of customers interested in it.

»Our profile is a one of a party place for wealthy personnel or firms and that partly results in that the big mass won't come here.«

The CEO expressed that the new vision that guides the development of the firm is its want to have a holistic view on customer relationships. Moreover, it wants to take a step further and change its business concept so that it serves better the customer's customer.

»And when the customer's customer is satisfied so are our customers and that brings money to all of us.«

How the firm plans to achieve this goal is to recognise how it can take a more active part in the end customers' process from rousing the initial interest to making them want to come back after leaving the destination. The value proposition formulated in BMC was transformed into »providing customers with memorable experiences which create positive energy to carry them in their every day lives«. The firm wants to be seen as a service provider who offers holistic service that recognises and meets the individualistic needs. At the same time the basis of pricing is meant to change from history-based calculations into the valuation of the customer experience provided.

The BMC served as the initiator in the peer discussion. The discussion started with a review of the current situation and a recognition of the drivers behind the need to change the business logic. There were also some tension to be seen that was brought up both by the change drivers and the actual change planned. One of the main concerns that the CEO talked about in the peer discussion was the question how the firm should position itself with regards to its network partners and competitors as it moves towards service business logic. In this change the firm wants to take into account the actions and reactions of the actors in its network. Consequently, in the BMC describing the new vision more attention was paid to taking a more comprehensive look on the partners and their significance.

The new vision of the firm was clearly stated in the BMC and also in the discussion. The change of focus on the end customers and their entire service process was highlighted. Thus, the peer discussion revolved around themes relating to customer segmentation, customer relationships, marketing channels and the message conveyed to customers. With regards to attracting new customers brand and image issues were brought up.

7 Learning tools for business logic transformation in three firms

The focus of our analysis is on the meaning of learning tools that assisted to reconceptualize the business logic and to perceive the transformation needed between the prevailing logic and envisioned logic. The BMC model and the peer discussions are elaborated here as intertwined but separate tools of learning that contributed to each other. In the analysis we show that even new tools were needed to create and grasp the idea of envisioned business logic. Thus all the used tools contributed to each other, for example, by giving historically and contextually loaded meaning to business modelling. In this chapter, we firstly elaborate firm by firm what can be discovered from firms' interpretations of their envisioned business logics and what was the meaning of the tools in illustrating the components of that vision. Thereafter we present the relevance and some developmental needs of learning tools used to help business logic transformation.

In Metaloy the vision of service business logic means a transformation from a subcontractor of massproduced services for metal plants to a partner with subcontractors. As the picture that the CEO included in the BMC assignment illustrated the metal plants had several subcontractors that usually were SMEs. Thus the core idea in the value creation of the new service logic in Metaloy embedded a change in division of labour between the contracting metal plants and subcontractors. A transformation of logic would turn Metaloy from operating at massproduction based logic into a new type of logic that is based on expertise in services, parts and assemblies that the subcontractors supply to metal plants. Our interpretation is that the concept of hybrid organization would denote in the case of Metaloy the expertise of a metal industry broker and a trusted partner. The picture drawn by the CEO illustrated this concept-level transformation which could not have been grasped and perceived with the BMC. Therefore two additional tools were used in Metaloy in mediation of a comprehensive change in business logic. The notion of "hybrid organization" acted as a trigger that mediated the reconceptualisation of the service business logic, which was materialized as a business logic in the picture. In the picture a the envisioned business logic as concept-level illustration showed changed principles and relations of the actors in the network of metal industry.

In Eninfra the challenges of the prevailing business can be seen as twofold. First, in the energy industry there are rules and generalized practices that guide the selling of the infrastructure services. Furthermore, practices in customer relationships had long roots in the history of the firm. Both of these challenges resulted in an outwardly directed and fixed business model without much flexibility to find a competitive advantage or an opportunity to differentiate the value proposition. Therefore, Eninfra could not aim at a complete transformation of the business logic but was striving for an extension on the tools and practices that would strengthen customer loyalty. The services were highlighted as an opportunity to maintain close customer relationships and convince customers to retain.

In Eninfra BMC model was used as a tool for expressing multivoicedness of the three participants in finding a shared understanding of the key issues related to the new business logic. However, not all of the components in BMC

model were equally important for Eninfra as the change of logic would not be very dramatic. Therefore the value proposition was a central indicator of the future direction for the business of the firm. The dialogues in peer groups then convinced the three participants that they had found a right track with their business ideas. The logic based on close business relationships was to be expanded with actions that would deepen customer understanding and give Eninfra more opportunities to deal with increasing customer demands.

The reason for the Touriserv's participation in the training program was the changing business circumstances. The marketing of services of the tourist resort was now partly at the hands of a new actor which changed the position of the firm in the network of actors of the tourist resort. Therefore, the Touriserv had recently also reorganized its business. The purpose of integration of different business units was to enhance the creation of customer value from the first contact to the last. Furthermore, the CEO of the firm expressed a need to renew the image of the firm in order to attract especially family market and increase the occupancy rate during the winter season. As the markets were not static a closer customer relationships and more customer value understanding were needed to increase customer retention and to expand the customer base. The customer understanding was expected to be gained through focusing on the end users and developing a more customer value-based approach. In this firm the of business logic was transforming from a market-based into a visitor-based one.

BMC model for Tourserv was an initiator to capture a more customer-centric business idea. However, only in peer dialogue the conflicting background as a driver for searching for a new competitive advantage and new business ideas was manifested. The changes in the business circumstances had emerged quite suddenly and were expected to have longstanding impacts on Tourserv. Therefore, there seemed to be a greater need for additional elaboration of the business vision and actions needed in finding a sustainable solution for the business. This need was brought up in the encounters with Touriserv's CEO that followed the peer discussion.

The analysis of the three cases indicate that BMC enables to make categorized comparisons between components of prevailing and envisioned logic, but does not enable to identify other indicators that could highlight the actual need of change and differences between the logics and, thereby, specify a new potentiality in service business logic. In our analysis we were able to find the indicators that explained the need for and extent of the transformation of business logic. The narratives of all three cases highlighted the contextual indicators, historically emerged business circumstances and business position as drivers for the transformation of logic and as factors that set limits for development of a business logic. Therefore, we saw that the »scale of perception« of a new vision is bound to the contents of BMC that does not necessarily allow to grasp the hypothesis of a comprehensively new concept-level transformation of business logic as the case of Metaloy revealed. With the BMC the critical questioning of the prevailing principles of business logic remains also undone. In Metaloy there was a motive to make a full-scale change in the business logic and the use of an additional, »self-made« visualization was needed to grasp this change. Thus in Metaloy the BMC model acted as an complementary instrument to concretize this change. We follow Engeström et al. (2005) and interpret the concept of hybrid organization as »a sign tool« which act as an initial idea of the germ cell for interpretation of »where to« the firm is heading to. Correspondingly the self-made visualization of the old and new business logic that the CEO drew was a system model and a mode of prototyping to explicate both »what« the old and new images of the business are and will be and »why« the principles of the logic needed to be transformed. Because the CEO had used concept-level tools with the BMC the group dialogue was not only one space for orientation to service logic with peers, neither was it only space for drawing ideas but a space to test a potential business idea.

Instead, in the cases of Eninfra and Touriserv the BMC acted as an orientation model for less dramatic changes in the business logic, and more or less as an indicator to strengthen firms' prevailing business positions. Therefore, the BMC was applied as a situation-specific and structural tool to fill the gap between the demands of the increasing competition, complicating business circumstance and dealing with the service offering that would satisfy these demands. Thus the peer group dialogues revealed that all the components in BMC were not equally relevant to the case firms when dealing with the new business idea and transformation between logics. However, in accordance with Viljakainen et al. (2013) for all the cases the value proposition component was a most relevant in BMC as it seemed to crystallize the purpose of the business logic and the basis for transformation towards service business logic.

8 Concluding remarks

All cases explicate that the BMC was used for different purposes under diverse circumstances of business. Even though all firms shared a need for development of service logic the building blocks of development were based on different components and emphasis. We suggest that BMC tool had a mediating role that made it easier at the initial phase of the training program to sort out and categorize the business logic transformation and to orient the firm to service logic.

With evidence of these three cases we claim that there is a need for various learning tools to reconceptualize the change of a business logic. We propose that an additional systemic model is needed to reveal the systemic and dynamic nature of the transformation of a business model. There is also a need for a tool to mediate the need to develop the business logic. This tool could highlight the driving forces of the firm specific business circumstances as well as the drivers and triggers embedded in changing business environment. Such a tool should also enable critical questioning and reasoning of the change needed for reorientation and learning of new principles and practices that the new business logic calls for. We agree with Viljakainen et al. (2013) that tools should not be too complicated and suggest that it is important to look for several tools that fit with the particularity of each firm and its business circumstances.

Answers to the questions of „where-to“, „what“ and „why“ could be found with the thought experimentations. However, the question of „how“ remains unclear. Furthermore, referring to von Hippel and Tyre's (1995) observations that the real problematization of an uncharted terrain can only take place in the realities and practical encounters of the firms. Therefore, all of the questions for the case firms were put into a new trial with an new assignment that followed the assignments of thought experimentation. The participants of the training program were proposed to pilot some new business ideas at the interface of the customers.

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Networked business models: A case study from the wind power industry

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The literature on business models recognizes model development as a networked process involving various actors but providing little empirical evidence on how the process evolves, particularly concerning service-based models. Focusing on a project business setting in the emerging Finnish wind power industry with its various actors, we examine the dynamics of model development and analyze how business models evolve as a networked process between business actors. According to the study findings, the network actors are extensively involved in each other's model development and in particular in defining the contents of the service offering, which also influences each other's strategy.

1 Introduction

The growth of a knowledge-based service economy has led to a situation where innovative efforts in businesses are to a large extent related to the innovation of new service offerings (Howells 2000). At the same time, the deregulation and globalization of service markets as well as the internationalization of service providers have led to increasing competition in services industry (Stevens;Dimitriadis 2005). As a result, service providers and public institutions are putting effort into raising competitiveness through innovations that aim at providing outstanding value to customers (Bougrain;Haudeville 2002; European Commission 2011). Extant research suggests that this necessitates more than only renewal of the contents of services. The change should take place through rethinking of business models (Normann 2001, 81–82; Chesbrough 2006, xiii).

According to extant research, companies developing service-based business models need to design their value propositions around the customers' businesses and processes. This calls for development of a dynamic portfolio of offerings where the content differs according to the customer and changes along with customer needs (Kindström 2010). The studies have generally examined the business model from a single firm perspective where the business model provides a tool to analyze the firm's way of conducting business or business logic (Kindström 2010; Palo;Tähtinen 2013). Several studies have, however, suggested that innovation can succeed only if relevant resources are shared, combined, and developed between actors (Pittaway, et al. 2004; Cassiman;Veugelers 2006; Rusanen, et al. 2014). Resources are typically in the possession of various business units of firms (Swan, et al. 1999; Hansen 2002) and in a variety of firms and other organizations (Oerlemans, et al. 1998; van de Ven 2005). Therefore, actors increasingly lean on networks to access resources (Pittaway, et al. 2004; Lind, et al. 2012; Rusanen, et al. 2014), which increases their dependence on the network partners (Möller, et al. 2005). This holds especially true with services that support customers' value creation processes and are typically provided by a network of actors (Lusch, et al. 2010).

Apart from some recent studies (e.g., Palo;Tähtinen 2013), the network has not been part of the business model literature. Although extant research posits that the network has a notable influence on the actors involved (Rowley 1997; Zaheer;Bell 2005), academics have paid scarce attention to the influence of the network on the business models of the actors. Similarly, research on service-based business models remains underdeveloped, while the focus has been on product-based technology business (Kindström 2010). Thus, there is a need to incorporate both the network element and the services perspective in the research of business models.

The purpose of this study is to explore the role of the network in business model development at service provider firms. This study adopts a view that emphasizes the role of the business model as a communicator of business logic and as a tool in its management, from design to implementation (Osterwalder 2004). We approach the topic with the following subquestions:

- What are the drivers of business logic change in service firms?
- How do the network actors influence each other's business models?

This is accomplished by drawing on a longitudinal case study that examines innovation of service offerings together with new business models in three focal business-to-business companies and their networks in the field of wind power services.

This study contributes to the business model literature by demonstrating how the network influences the development of business models in service firms. It broadens existing knowledge especially on the role of networks in business model innovation and in the development of solutions and service portfolios.

The paper is organized as follows. The literature review section provides an overview on the extant value and network-oriented business model literature, on network perspectives in business model innovation, and on business model development in services. The following section describes the empirical research methodology. Then, three cases illustrating innovation of service offerings and business logics in networks are presented. This is followed by the findings. We conclude the paper with implications for research and practice.

2 Literature Review

2.1 Value and network-oriented business models

Interest in studying business models followed the expansion of Internet-based business, which provided a platform for multiple variations in firms' business logic (Pateli;Giaglis 2004; Zott, et al. 2011). Business models have been studied in various fields with different perspectives (see Shafer, et al. 2005; Zott, et al. 2011; Palo;Tähtinen 2013). This study takes the value and customer-oriented approach to business models (Pateli;Giaglis 2004).

Business models are typically seen as a critical link between strategy and operations in the organizational entity (Wikström, et al. 2010). Shafer et al. (2005) define a business model as a representation of a firm's underlying core logic and strategic choices for creating and capturing value within a value network. To a great extent, business model research has adopted the perspective of an individual firm (Wikström, et al. 2010; Palo;Tähtinen 2013). Business models have been described as a tool for individual firms to analyze and develop a way of conducting business, ranging from business model design to its implementation through infrastructure and processes, and simply communicating it to external parties (Osterwalder 2004). The rooting of models in e-business enabled this approach: a company defined its value offering and on the secondary phase, identified the entities and their contribution that would be needed for the total value creating system (Tapscott, et al. 2000, 15).

The extant studies, extensively focusing on business models as a static construct, include detailed reviews of the models and their value-creating elements. Among those elements the most regularly counted are strategic objectives, value proposition, revenue logic, target market, resources and key activities, value chain or net, and partnerships (Osterwalder 2004; Pateli;Giaglis 2004; Morris, et al. 2005; Shafer, et al. 2005; Nenonen;Storbacka 2010; Zott, et al. 2011).

The locus of decision making is in the firm developing the offering, and the assumption is that any component needed is available and can mechanically be added to complement the core offering. The value net consisting of suppliers and partners is viewed as a part of the firm infrastructure or architecture, providing access to external resources that for an individual firm ultimately serve as a source of competence (Osterwalder 2004; Morris, et al. 2005).

On the other hand, individual firms have been seen indirectly influencing each other's business models through market practices. Here the business model serves as a central construct in explaining the formation and evolution of market configurations (Nenonen;Storbacka 2010). According to this view, the market actors negotiate through their business models which aspects of their resource and capability configurations are being used and how they interact for value co-creation. Through their resource and capability configurations, the actors consequently participate in shaping the markets. Even an individual actor can influence other actors' business models if it is able to initiate changes in market practices.

These two perspectives, the wider network of partners as a source of resources or firms influencing networks of the business actors that operate in certain industries, markets, or their intersections, form the dominating views on networks in business model research. Recognizing the significance of networks for business actors in designing and implementing their offerings, we suggest that these limited views can be revised to better correspond to the networked reality of many business sectors. When networks as structures replace part of a firm's internal activities and resources, this releases the firm to focus on its core but also increases its inter-dependence. Consequently, business models are no longer independently manageable by individual firms but require coordination and cooperation.

2.2 Business model innovation with a focus on networks

Business model innovation can be defined as the search for new logics of a firm and new ways to create and capture value within its value network (cf. Shafer, et al. 2005; Zott, et al. 2011; Casadesus-Masanell;Zhu 2013, 464). Business model innovation is increasingly seen as the key factor behind firm performance and takes place when the firm pursues transformation and renewal (Ireland, et al. 2001; Demil;Lecocq 2010; Zott, et al. 2011). Business models may be developed in response to internal or external drivers (Kindström;Kowalkowski 2014), such as technological change, change in customer demand, or change in the social or legal environment (Osterwalder 2004).

Development of a business model requires profound customer, competitor, and supplier information and intelligence that may consist to a significant extent of tacit knowledge (Teece 2010). Some business model studies have responded to this challenge by focusing on business network research, which emphasizes the importance of the resources that the actors combine in order to provide new constellations and create value for the end customer and each network actor (Håkansson;Snehota 1995; Möller, et al. 2005).

By eradicating the boundaries between the different groups of external parties, the channels and partners are treated as a wider network element by Nenonen and Storbacka (2010). Taking a value creation perspective on business models, they suggest that there is shift from a business model being a static tool for the firm's internal use toward networks consisting of external actors that participate in creating value. This implies that the model as a construct should be externally orientated, mapping the key relationships and their functions that a firm has in its value network. Also according to Magretta (2002), business models inherently emphasize cooperation, partnerships, and joint value creation.

A pioneering study is an empirical examination of the networked business model development by Palo and Tähtinen (2013) that takes place with a strategic net of actors with the aim of developing, producing, and marketing a technology-

based service. The networked business model describes how the strategic net creates value instead of focusing on a single firm. Palo and Tähtinen propose that the business model development is dynamic rather than static, referring to the constant need to adapt the business model according to the environment and changes in the net. The business model is transformed through various encounters between the business network actors involved in the model development.

Focusing on technologies and ideas that are accessed and exploited from outside or given to others to be used, Chesbrough (2006; 2007) introduces the concept of the open business model. The idea is to be able to make effective use of open innovation by extending it to also include business model innovation (Chesbrough 2006). Business model innovation calls for establishing co-development relationships between actors that aim to create and deliver a new product, technology, or service together (Chesbrough;Schwartz 2007). The business models of partners are integrated during co-development, which increases the chances to sustain or even expand the co-development partnership in the future (Chesbrough 2007).

2.3 Business model innovation with a focus on services

Firms inventing themselves and their offerings anew promote addressing the customer needs and capturing the value in competitive markets. The literature on business models has recently recognized the shift from firms that provide services to complement their physical product offerings toward service offerings in the center of the value offering as such an action (Kindström 2010). The framework of Bessant and Davies (2007) includes different types of service innovations that can also be used to analyze the business model when there are changes with regards to (1) the service offering, (2) the service creation and delivery process, (3) the context of the service, or 4) whole paradigm changes.

Palo and Tähtinen (2013) suggest that the service business model evolves through service development, pilot, and market phases intertwined with simultaneous business net development and opportunity recognition. The business model evolves constantly during these phases instead of merely being the end result of the development.

A service business model can be divided into ten fundamental elements, similar to other commonly mentioned model elements: (1) strategic objectives, (2) structure, (3) offering, (4) revenue mechanism, (5) development process, (6) sales process, (7) delivery process, (8) customer relationships, (9) value network, and (10) culture. Strategic decisions set the foundation for service innovation. The organizational structure may either inhibit or promote innovation, and therefore the structure should be organized so that service innovation can take place. Offering refers to services that the firm intends to offer and to the development of a coherent portfolio of services. The revenue model includes pricing strategies and methods. The development process aims at concept development. The sales process includes, e.g., methods to sell services, incentive systems, customer involvement, and ways to communicate with customers. The delivery process consists of service delivery organization and interactions with customers. Customer relationships refer to depth, intensity and duration of customer interaction (Kindström;Kowalkowski 2014). The value network is a network of actors that co-produce and exchange service offerings and co-create value. Typically a value network consists of supply chains, but also customers can be important co-creators of value (Kindström 2010; Lusch, et al. 2010). Culture refers to establishing a service culture inside the organization (Kindström;Kowalkowski 2014).

An integrated perspective on services integrates innovations in various elements of the business model. Firms pursuing service innovation thus need to address the above elements of the business model (Kindström;Kowalkowski 2014).

The need for integrating a network of actors to stimulate service innovation development and adaptation has been long recognized. Services developed to support customers' actions require relationship orientation and from the service provider's perspective, knowing customer processes (Frambach, et al. 1998). The growing tendency of providing solutions and complex systems has further consolidated this need of more tightly integrating the networks of actors (Naude, et al. 2009). Research using a network perspective on development of solutions and services suggests that a process perspective is relevant because it emphasizes customer participation (Tuli, et al. 2007; Naude, et al. 2009).

Going beyond customization and integration, the process steps that can be added are requirements definition, deployment, and post-deployment (Tuli, et al. 2007). Defining requirements in a nascent industry can be particularly challenging; finding an optimal combination of technologies and services and offering them to customers who may not be fully aware of all the options requires multilateral interactions to collect and amalgamate the dispersed views of the actors (Lambe, et al. 2000). In the deployment stage, when delivery and installation take place, the customer requirements are often clarified (Tuli, et al. 2007; Naude, et al. 2009). When services form the business model core offering, deployment and post-deployment can merge; maintenance service is an add-on for products but can represent an offering in its own right.

The earlier view on developing new business emphasizes the formal evaluation of business opportunities through feasibility analysis, due diligence, and by using the stage-gate model. Stage-gate consists of several evaluation phases that the business idea must pass in order to proceed toward the markets (Ardichvili, et al. 2003). The more recent view is that opportunity recognition and business idea refinement for services can be approached by using a networked business model as a dynamic device (Palo;Tähtinen 2013).

Recent research on service innovation points out that the customers participate in developing services (Kindström 2010). The relational orientation and networking practices when designing service offerings are needed because service providers have to know the total operations and profitability of their customers. Service offerings typically penetrate

deeper into the customers' operations than product offerings, requiring more extensive coordination. Similarly, the organizational interfaces often entail both operational- and strategic-level interactions (Kindström 2010).

Figure 1 provides a tentative framework of business model innovation in services. It illustrates the connections between the chosen business model elements, strategy, network, and service innovation when developing a business model. The figure has been drawn on the basis of the extant literature.

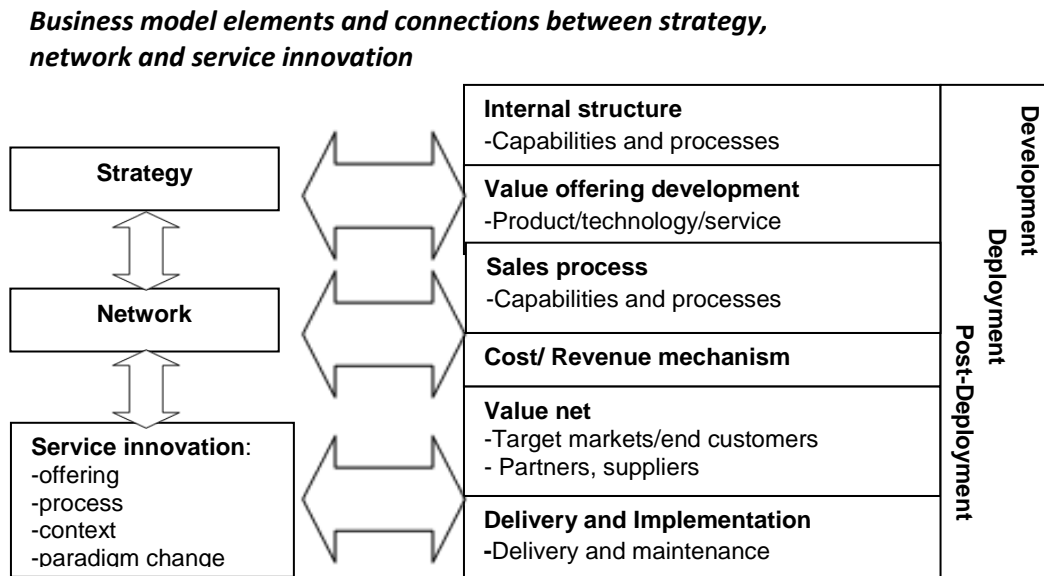


Figure 1. Framework for business model innovation in services.

In the business model, firm strategy is converted into applicable model components. While the network component is part of the business model, network actors at the same time shape the model and its value offering in particular. The strategy of each individual firm is influenced by the network. The phases of development, deployment and post-deployment that are typical to project business are included in the framework as it is suggested that the model can be described from the process perspective and the actor involvement in the model development can be examined in each phase. Certain model components can be associated with the phases, but the linkages are guiding and not definitive because, e.g., the flexibility of the service offering allows modifications on the later phases and the network component can contribute to other parts of the model throughout the project life cycle.

3 Methodology

3.1 Research strategy

Applying qualitative methodology, the study is constructed as a multi-case study (Stake 2008, 123) with three innovation projects in networks as empirical cases: two service portfolio development projects and one solutions development project. The study follows explorative and descriptive strategy (Saunders, et al. 2012, 171). Case studies are typically conducted when exploring networks and relationships as they provide the means with which to develop a multidimensional perspective on the phenomenon in a specific context (Järvensivu;Törnroos 2010). Qualitative case study research is employed in this study as it enables exploration of business model development by building understanding on the innovation processes with various informants involved (Silverman 2006, 349; Pratt 2009).

This study applies process research when studying the cases; that is, three innovation projects in networks. Process research studies how events emerge and evolve over time in a context (Halinen, et al. 2012). Process research enables exploration on the innovation process in networks in this study.

The case companies are Finnish firms operating in the wind power industry. In-depth interviews among firm key decision makers serve as a primary source for the data collection. The link between theory, empirical phenomena, and method is formed by applying an abductive approach (Kovacs;Spens 2005; Dubois;Gibbert 2010). The abductive research process comprises constant iteration among the research steps (Eisenhardt 1989).

3.2 Empirical cases

When choosing the cases for this study, it was important that the phenomenon of interest – simultaneous business model development and service development in networks – clearly existed (Stake 1995, 56; Dubois;Araujo 2007). Therefore, cases were selected by employing purposive sampling. The aim was to find rich cases that would help fulfill the research objectives (Silverman 2006, 306; Dubois;Araujo 2007).

The service was to be designed in a network comprising at least three organizational actors (see Möller, et al. 2005). The cases needed to be such that a pilot version of the service was available to enable a study on the actual innovation and business model development process. It was necessary for the innovation process to still be under way in the chosen cases so that the informants could better remember the innovation process and so the cases could be followed in real time.

A multiple case study creates a more robust theory as it is more deeply grounded in varied empirical evidence. Multiple cases enable broader exploration of research questions and theoretical elaboration. In multiple-case studies, the choice of cases is based more on the contribution to theory development within the set of cases than on the uniqueness of a case (Eisenhardt; Graebner 2007). Table 1 provides an overview of the three focal case companies Alpha, Beta, and Delta, each of which ran one innovation and business model development project.

Table 1. Overview of the focal case companies.

Firm	Alpha	Beta	Delta
Industry	Design, construction, installation, management, and maintenance services and information system solutions within the energy, telecoms, and manufacturing sectors	Manufacturing of fastening technology for concrete connections and composite beams for slim floor structures	Engineering, design, and consultancy services within the energy industry, traffic infrastructure, manufacturing, civil engineering, and the environment
Number of employees in 2013	2,800	1,100	1,400 (subsidiary)
Turnover in 2013	325 M€	126 M€	105 M€ (subsidiary)
Operating range	North Europe	Global	Finland
Business development projects addressed in this study	Service portfolio for wind power construction and production	Foundation solutions for wind turbine towers	Service portfolio for wind power construction and production

The two wind power service portfolio cases and solutions for wind turbine foundations represent service innovation in an emergent business field. Only at the end of 2008 did the government of Finland approve the long-term climate and energy strategy, which was based on objectives proposed by the European Commission regarding the reduction of emissions and promoting renewable energy. The directive demanded that Finland had to increase the share of renewable energy to 38 percent of its total energy consumption by 2020. The Finnish government set the objective that six terawatt hours (TWh) of energy would be produced by wind power in 2020. This would mean more than 800 wind power plants with the capacity of 2,500 megawatts (MW) in total (Tarasti 2012).

Alpha's service portfolio for wind power construction and production is developed both inside the firm in various business units and with customers, suppliers, consultants, and university students. The service portfolio can be characterized as an architectural innovation that bundles existing services and also an innovation in processes and organization of existing services (Gadrey, et al. 1995). Inside the portfolio, a radical innovation (de Brentani 2001; Gallouj 2002, 72) also occurs (i.e., the wind power portal).

Foundation solutions for wind turbine towers formed a new field of business for the fastening technology firm Beta, which, together with two consultants, innovated a new kind of on-shore foundation in which Delta is the main consultant with a new relationship to the fastening technology firm. The first foundation prototype was tested and further developed with the new customer Alpha. At the same time, services concerning the foundation were developed so that the foundation could be provided as a total solution. The foundation solution represents a radical technology innovation that opens new business opportunities (de Brentani 2001; Gallouj 2002, 72; Möller, et al. 2005).

Delta's service portfolio for the wind power industry is predominantly developed in various business units within the company but also with foreign sister companies. The aim is to build a total package comprising a variety of existing services for the wind power industry. Delta's service portfolio development represents process excellence and flexibility that calls for a process improvement capability. However, it simultaneously provides a new solution that supports customers' businesses and also necessitates capabilities for incremental innovation (Möller, et al. 2005). The service portfolio can be characterized as an architectural innovation that bundles existing services and also as an innovation in processes and organization of existing services (Gadrey, et al. 1995).

3.3 Data collection

Case study data were collected longitudinally in three service innovation projects between January 2010 and December 2012. As the research included multiple cases and studied a strategic phenomenon (i.e., business model development

and innovation), interviews comprised the primary data source (Eisenhardt;Graebner 2007). This study collected data at intervals of approximately a year between 2010 and 2012. For a period, the duration of data gathering was approximately one month in each case. Altogether, 18 interviews were conducted, some of which discussed two different innovation projects. Ten interviews were related to the service portfolio development at Alpha, six interviews discussed foundation solution development at Beta, and eight interviews dealt with service portfolio development at Delta (see Appendix 1).

This study applied qualitative interviewing (Warren 2002, 83). The interviews were conducted in the form of guided conversations (Yin 2009, 106). Similar to a conversation, every interview was newly constructed. Each conversation was unique; the researcher matched the questions to the respondents' experience and expertise (Rubin;Rubin 2005, 4, 12). Qualitative interviewing can be employed to describe various events and processes. The interviewer seeks depth, detail, and richness in interviews, which is also termed "thick description" (Rubin;Rubin 2005, 5, 13). Therefore, interviews were based on three kinds of question: main questions that guided the conversation, probes to clarify answers or request further examples, and follow-up questions that pursued the implications of answers to the main questions (Warren 2002, 86-87).

Most of the interviews were conducted face-to-face at the respective company's premises, and a couple of interviews were conducted by phone. The interviews lasted between 50 and 150 minutes. Interviews were audio recorded and transcribed verbatim.

Secondary sources included workshops with the case companies, observations in the wind power workshop of the consulting firm Delta, information on websites and in the business press, as well as information on industry in general. Each data source helped make the phenomenon visible in a different way and provided a more in-depth understanding of the focal phenomenon (Denzin;Lincoln 2008, 5, 7).

3.4 Data analysis

Data analysis began with a coding and categorization procedure. The research questions guided coding and creation of categories from the beginning. First, various actors that influenced business model development in each innovation case were sought. Extant literature on business model development in services and networks provided the lenses through which the data were analyzed. Data categorization was first made on the basis of Kindström's and Kowalkowski's (2014) division where a service business model is divided into ten fundamental elements: strategic objectives, structure, offering, revenue mechanism, development process, sales process, delivery process, customer relationships, value network, and culture. Each of the three innovation project cases were separately analyzed, and the possible influence of the found network actors were examined in connection with all ten service model elements. The data were coded employing NVivo10 qualitative data analysis software. On the basis of the analysis, the elements were subtracted to cover the ones where network actors played a visible role. According to the principles of qualitative research analysis, data were then compared with data, with existing theory, and with results from previous research (Marshall;Rossman 2006, 156).

4 Case Study

4.1 Alpha's service portfolio for the wind power industry

4.1.1 *Alpha's business model innovation – new business in a new industry*

Alpha is a Finnish service integrator specialized in project management in the energy, telecommunications, and manufacturing sectors. The company has capabilities in design, construction, installation, management, and maintenance services as well as IT services in the energy sector. For Alpha, the expansion to wind power was a worthy business option, and Alpha's decision to take it up was partly driven by institutional decision making as the Finnish government had announced its commitment to promote renewable energy production by 2020.

Alpha's experience from setting up and maintaining power plants for the traditional energy companies formed a foundation for extending its service business toward new energy solutions. The environmental goals of Alpha's new and potential customers and their interest to produce energy in a cleaner way in particular encouraged Alpha's move to the wind power business. Service and business model development for wind power was started with a core team consisting of managers from different business units of Alpha and a newly appointed business area director for wind power. The corporate management formed a steering group that commented on the team's proposals. Later, project teams were appointed to manage the capabilities and combine them into new services. The corporate management approved the project plan. In two years Alpha had identified ten different entities that formed its service offering. Internally, the life cycle of the wind power production was a starting point for the project team in garnering the capabilities.

4.1.2 *Network actors influencing model development*

Alpha's aim to develop an encompassing service portfolio was supported by a cooperative approach, also stated as a leading concept in the firm's strategy. For the firm that was transforming itself into a service integrator, it was critical to

involve the customers and the key partners and suppliers in the development. In addition to the service offering, Alpha also asked for their feedback on the internal process and system development. These actors included: 1) investors interested in funding the new opportunities but lacking experience from clean energy business and therefore seeking a comprehensive service covering all the phases of the life cycle; 2) energy companies expanding their business to wind power; and 3) turbine manufacturers. As a result of the internal work and response of the network, the different service modules were further elaborated and modified in terms of their content and processes.

4.1.3 Defining the offering with the customers

A careful market study helped Alpha to define its value offering. The existing and potential customers were asked systematically about their plans for new projects, challenges in wind power, and the services they might need. The view of the customer was emphasized in the new service development. Alpha's business area director for wind power noted: "Our firm does not work in such a way that first we would develop here something and then we would sell it, but the development is always linked in some way to solving the problems of the customer." Alpha's task was to convince the customer to buy the service, as the sales director of Alpha observed: "Our operations are based on outsourcing, which means that we suggest to the customer not to do this by itself but let us do it."

As a service integrator, Alpha took responsibility of the interfaces with other suppliers, thus widening the set of services toward customers. For the customer, the added value was clear as they had only one partner needed for discussions. Alpha's R&D director explained: "Our starting point is that we want to be a service integrator so that the customer can hand over to us a great amount of tasks that we do not deal with internally but we will oversee their integration to the customer operations."

Alpha's advantages included tailoring specific customer solutions and high-level services that overcome in-house production and being able to carry risks and to operate in a cost-effective way. Sharing the risk in terms of costs that might exceed the planned costs was concretely carried out in Alpha's business relationship with one of its customers. Conversely, the company was able to reap bonuses if the costs were lower.

Alpha's customers were positive about the firm's interest to understand their needs. However, many of the customers were at the same time also providing services. Alpha had to consider the customer preferences for in-house service production and to refrain from offering overlapping services. For the customer, defining the offering was about finding an optimal solution. "When one's organization is built and developed, of course it has its price. If we buy from outside, it also has its price. It's about finding a balance and considering the model that fits" (Alpha's energy producer customer). For example, project planning was excluded from Alpha's services because that was defined as the customer's domain.

Meetings with the customers, however, opened avenues for new innovative services. Development of software, a wind power plant portal, was, for example, driven by the customer's need to receive more information in a centralized way concerning the condition of the wind turbines and actions taking place at the wind power plant.

4.1.4 Defining the offering with strategic suppliers and other partners

Operating as a service integrator required cooperation with group- or country-level strategic suppliers. Each actor had a clearly defined role in providing services. Similarly, the service offerings were formed and delivered in cooperation and were based on each actor's capabilities. Defining the services with the strategic partners required clarifying their future interests.

It has gone so that we first discuss what each party would like to do. Afterwards, we see how much our suggestions overlap and if the partial services fit to each other. When we have common customers, we also need to decide who is going to give up certain offerings and who is eventually going to provide them to the customer. The basic offering is fit together in this way. (Alpha's business area director for wind power)

Figure 2 illustrates the network of actors that influenced Alpha's service portfolio development.

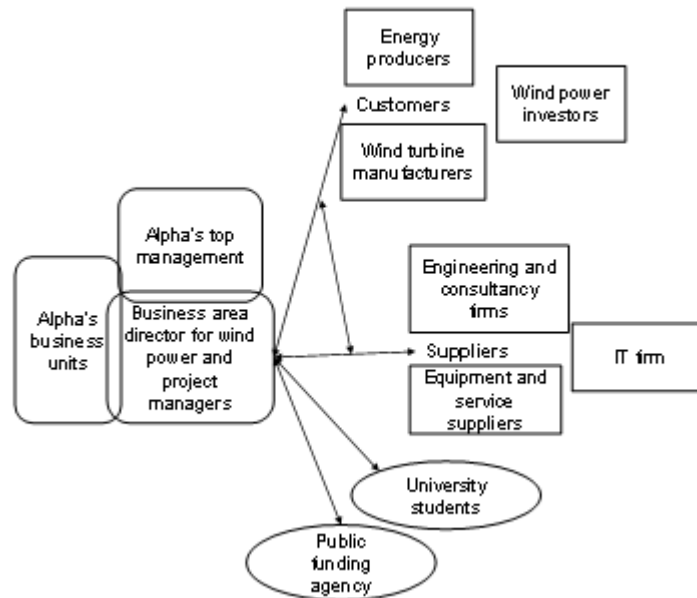


Figure 2. Network for the wind power service portfolio development project.

The nature of the wind power business as a nascent industry impacted the constellation of Alpha's network; it was under constant change in terms of established relationships. Their formation was dependent on partly unexpected moves of other actors also impacting Alpha's offering. For example, the ten-year guarantee for wind turbines bound to service agreements excluded Alpha from the business opportunity as the turbine manufacturer chose to use other service providers for new plant maintenance.

The Finnish Funding Agency for Innovation, Tekes, provided funding for the development projects, and therefore Alpha was able to allocate funds for the smaller actors to support their service development. Those firms played the role of suppliers and consultants in the development project.

4.2 Beta's foundation solution for wind turbine towers

4.2.1 Beta's business model innovation – new solution for new markets

Beta is a Finnish provider of fastening technology for concrete constructions and composite beams for slim floor structures. The firm had earlier experience from supplying traditional energy companies and in 2009 made a strategic decision to expand its business to wind power. The study of the existing foundations for wind turbines revealed an underdeveloped space of more sophisticated foundations. Beta realized that it could best serve customers by developing a service, a turnkey solution with the design and components that Beta manufactured for the foundation of wind power turbines, as well as offering construction services. The innovative solution opened an avenue for providing remarkable added value, but at the same time it required managing the value chain and its links to a greater extent. "As a starting point, we realized that we are not able to provide added value if we do not manage all the areas in the value chain and provide with each link some added value" (technology director, Beta).

For Beta, the conversion into a service company implied increasing the number of interfaces on the customer side and in the partner companies. Internally, the shift from product orientation toward service orientation created its challenges in terms of a greater focus on customers and the corresponding resources. Beta's customers included those energy companies that had chosen to manage their own projects, as well as turbine manufacturers, construction companies, and engineering consultants that provided planning and design services. The service integrator Alpha had a dual role as a partner and customer of Beta. The firm approached Beta when they encountered a need to modernize foundation technology as part of their service offering. The technology director of Beta stated: "Our collaboration started because Alpha had a need for a technology partner, and we provided the possibility for that."

For Beta, defining the business model for the nascent industry of wind power required analyzing the firm's earlier experience that could contribute to the new business and cooperating with partners that were able to provide expertise in design and understanding the customer needs. With this knowledge Beta was able to evaluate the feasibility of the business and proceed to developing a business model. The original business model developed remained mostly the same with a few modifications over the years.

4.2.2 The network in the development and implementation of the offering

Beta's network was vital for defining the features of its offering and contributing to its development and implementation as the technology director of Beta described: "[The partners] are so important. We could not do without them. It is impossible to develop this kind of multidimensional solution on our own."

Defining the solution was thus based on the interplay between Beta, engineering consultant Delta, the system configurator, service integrator Alpha, and turbine manufacturer Epsilon. The discussions with them defined the path taken by Beta. For the sales and implementation of the wind turbine foundation, Beta cooperated with the engineering consultant Delta in two ways: First, Delta studied if there were business opportunities when new bids were announced. Together the firms then submitted their proposals. Second, Delta provided R&D, planning, and configuration of Beta's offering based on Beta's idea generation; their role was making sure that Beta's ideas could be technically implemented.

Beta's offering, however, had to be modified to fulfill the requirements set by the cooperation between turbine manufacturer Epsilon and the service integrator Alpha. The turbine manufacturer was considered the strongest influencer when the type of foundation was selected and its requirements defined. Alpha's well-functioning relationship to the turbine manufacturer Epsilon also served Beta's purposes as the firm was interested in receiving feedback from this market actor.

Beta's goal was widening the customer base with a mass-tailored solution. For this, it aimed at establishing partnerships and supplier relationships with the turbine manufacturers. The contacts with the new actors were also expected to boost the development of innovative solutions as the talks were likely to enrich the view on the current business. Figure 3 illustrates the network of actors that had influence on the foundation solution development for wind power turbines.

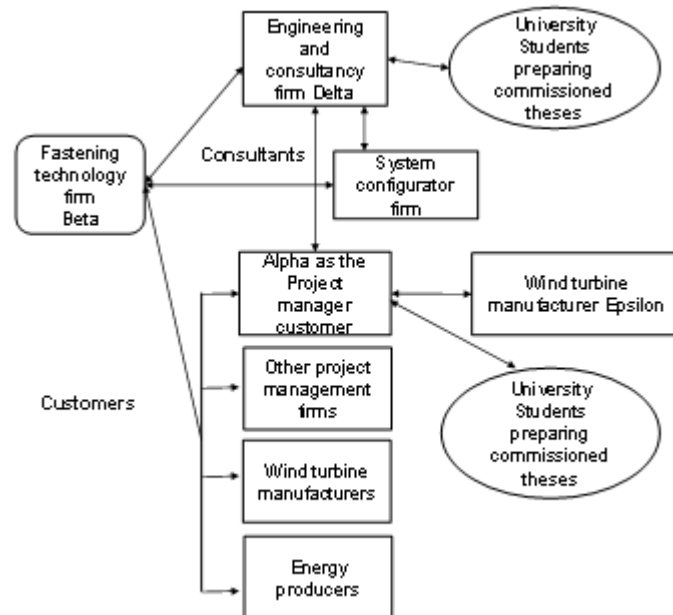


Figure 3. Network for the innovation of the business model for wind turbine foundation solutions.

Involving the customer as a partner to define the offering was different from a passive buyer role. The active joint development of solutions was expected to improve them, but it also increased the risk on each side: "In the development project each actor carries much risk, and this makes the ability to bear and manage that risk perhaps the most important thing. Another side is that the target is seen in the long term, even in years" (technology director, Beta). Accordingly, the time perspective in the relationship was expected to be longer than just the one project in order to pay back the investment in the development.

4.3 Delta's service portfolio for the wind power industry

4.3.1 Delta's business model innovation – total service package

Delta is an engineering company providing design and consultancy services for the energy and manufacturing industries and traffic infrastructure projects. Their business in the wind power industry started when they acquired an engineering firm that had carried out the first environmental impact assessments in Finland and laid the foundations for the field. When the wind turbine projects started to increase, customers increasingly demanded engineering and consultancy services from Delta. Soon Delta became the largest expert in the field in Finland.

In their strategic wind power projects, Delta aimed at combining existing capabilities from different technical fields and business units to provide total service offerings to their customers. In 2010, it established a wind power management group for coordinating the dispersed capabilities between five different technical fields. The company welcomed the new wind power business since one of its main businesses, transportation infrastructure projects, was impacted by the cuts in government budgets.

4.3.2 Model and service offering innovation as a response to customer needs

Delta's goal was to sell a full set of services to energy companies. Services needed to be modularized for this purpose. The wind power management group then planned a service package from the various modules, which was used for marketing purposes. This also required acquiring new capabilities associated with the new business: "The new wind power expert complements our set in such a way that now we can purchase turbines, too. We have knowledge on how to write quotes to foreign companies, to different turbine manufacturers" (regional unit manager, Delta).

Including new capabilities through recruitment and service innovation in expert groups inside Delta and designing a total service package was a response to customer needs. The energy firms had expressed their interest in wider service entities instead of buying services separately from different consultants. The shift from the latter choice could be traced back to the nature of the wind power business; while it demanded use of different experts, their large number would simultaneously complicate project management. Delta's customers felt that a large firm was a secure partner. Very small wind power actors did not always have sufficient resources for maintaining and managing several consultant relationships.

Governmental ministries and regional councils seeking environmental impact assessments and urban planning for wind power projects formed another customer group. Simultaneously, Delta provided R&D for infrastructure companies that were suppliers of wind power service integrators and energy companies. When the projects demanded, the company used subcontractors to provide planning services for electrical grids. Delta had given up on this business because their customers mostly performed their own electrical services.

4.3.3 The internal challenge of defining and implementing the offering

Although the new business was based largely on Delta's existing capabilities, internal coordination of the wide range of different technical fields was challenging. "Wind power is not that complicated. But the whole process has so many different pieces. It reaches from environmental impact assessment to planning the foundations and performing stability analysis for the turbines, and so on" (regional unit manager, Delta).

For Delta, serving the customers with wider service entities required seamless and efficient cooperation between the units. Furthermore, in Finland the firm had offices in several locations, each specializing in a specific technical field. This also challenged coordination of the service offering as each internal unit that in the past had been regarded as a separate "locker" now had to play together in order to combine their know-know. Figure 4 illustrates the network of actors that influenced the service portfolio development at Delta.

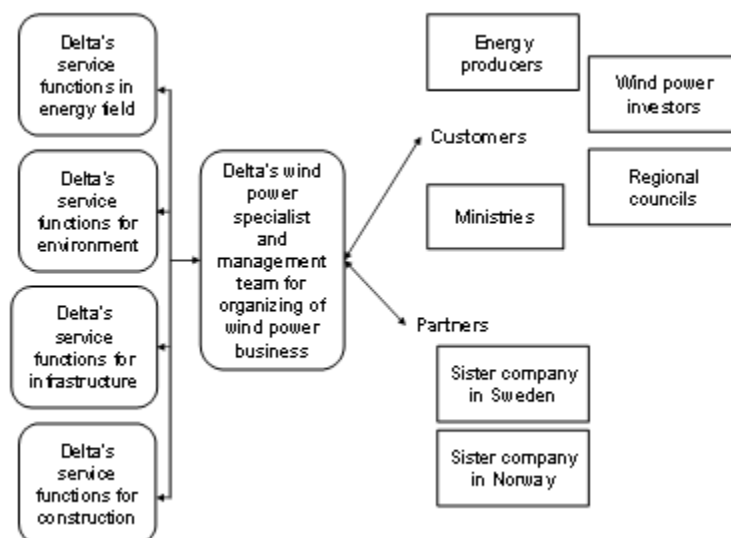


Figure 4. Network for the innovation of the business model for Delta's wind power service portfolio.

Also, the capabilities of the group's other Nordic firms were examined. The Swedish sister company could contribute to evaluations and Norway to wind turbine acquisitions. The firm in Denmark had a long history of experience in off-shore wind power projects. This knowledge needed to be better utilized in wind power projects, and the sister companies took steps toward closer cooperation.

5 Analysis

The case descriptions show how the business models of the selected case companies evolved in a networked and intertwined manner when new services were developed and how network actors influenced and directed other actors' choices concerning the model elements in each project phase. The following tables contain the key findings regarding each company with the respective business model element and actors influencing its contents. The tables 2, 3 and 4 also show the drivers behind development of the business model element and actions taken in this respect.

Table 2. Network actors participating in defining the business model elements of the Alpha case.

Business model element	Actors influencing element	Drivers for developing the element	Actions taken
Internal structure	Customers	Demand for large service entities because of new customers' small organizations	For the first time, different business units combine their capabilities as they respond to customer feedback
	Business units	Possibility to make use of firm-internal capabilities broadly and grow the business of various business units	Joining the forces for service portfolio development.
	Suppliers	Establishing new relationships to partners with broad capabilities	The service integrator no longer needs certain in-house experts as the suppliers have developed their capabilities in performing the services.
Offering and development process	Customers	Customer requirement	Avoiding overlapping offerings with customers.
		Customer need	Service entities modified in cooperation with customers. Developing flexibility in module composition through ten entities. Creation of innovative services that customers need.
	Business units	Offering together a service package	Developing the services modules in different business units under management team supervision.
	Suppliers	Objective between the partners cooperation instead of competition Good match between partners' resources	Partners provide complimentary service/technology for Alpha.
	Universities	Broadening knowledge and understanding	Students conducting research projects.
	The funding agency for innovation	Enhancing innovations in wind power	Funding provided for R&D projects in wind power networks.

Business model element	Actors influencing element	Drivers for developing the element	Actions taken
Revenue and cost mechanism	Government	Project feasibility	Government decisions on the tariffs ensuring project feasibility
	Customers	Customer requirements	Risk of exceeding/ the planned costs is shared with the customer. Pressure from the customers for more service and lower price leads to looking for cost reductions, e.g., through a resource management system innovation. New revenue models tested among customers, e.g., dependability.
	Suppliers/ Partners	Sharing between the partners	Partners receive a share of the margin in proportion to their added value.
Sales process	Customers	Existing customer-supplier relationships	Actor that has an existing relationship with the customer takes primarily care of the sales process when making joint bids.
	Suppliers	Project "ownership"	Actor that has initiated the project takes primarily care of the sales process when making joint bids.
Value network and channels	Suppliers	Partners jointly forming the network Definition of network roles and positions – Balancing between cooperation and competition	Partners create relationships to third parties. Carefully considering with which actors to act and how.
	Customers	Efficient and effective delivery of services	Building a network that provides possibly much value to the customer.
Delivery and implementation	Suppliers	Separate capabilities	Each actor delivers its services separately in the project but toward the customer as only one entity.
	Business units	Ensuring smooth implementation of projects	Planning jointly delivery processes of various services.

For the service integrator Alpha, the network was crucial in defining the service offering. The needs of Alpha's customers directed the contents of the service modules, which further influenced the formation of the value network in terms of supplier partners. Alpha's customer orientation highly contributed to an innovative IT-based service.

The customer preference of receiving comprehensive service from one service provider required Alpha to establish and maintain a network with the needed resources. With the supplier capabilities, cooperation widened to new areas and markets, e.g., through joint bids. Coordination between the parties shaped the offering and necessitated constant decisions on each actor's role toward the end customer. The relationships with some of the customers and suppliers were characterized with competitive elements as well.

The revenue and cost model was also influenced by the signals received from the network. The customers needed cost effectiveness but also understood the value added in the offering of the specialized service provider. Alpha also participated in sharing the risk and benefits with the customer.

Table 3. Network actors participating in defining the business model elements of the Beta case.

Business model element	Actors influencing element	Drivers for developing the element	Actions taken
Internal structure	Customers	Match to customer needs	Providing service entities requires more internal interfaces.
Offering and development process	Customer/ Partner	Match to the needs	Customer/partner (service integrator) participates in defining the contents of the offering and and contributes to the development of the foundation. Contributing to the design and technical feasibility.
	Engineering and system consultants	Technical feasibility of the offering	
Revenue and cost mechanism	Customer/Partner	Sharing the cost	Partner is expected to contribute financially in the development of the solution.
Sales process	Customer/Partner	Customer mediation	Sales contacts subjected to the customer's contacts
		Considerable input of the customer/partner in offering development	Making an agreement on joint bids.
		Various ways to acquire foundations for wind turbines and various actors influencing the acquisition decision	Customizing the sales process. Need to consider several actors in a wind turbine project.
Value network and channels	Customer/Partner	Balancing with competition	Agreeing in acting together in specific future projects.
		Variation in wind power project organizations	Building the network and channels to respond to various project organization models.
Delivery and implementation	Customer/Partner	Beta's solution was part of Alpha's service offering	Service integrator implemented Beta's solution
	Other customers	Customer's own scope of services	Erection of the foundation an option and implemented by partners.

As with Alpha, the network notably participated in the business model development of Beta when the combination of product and service was defined. The involvement of Beta's customer, the service integrator Alpha, and the turbine supplier influenced Beta's product and service design, which was carried out in cooperation with the engineering consultant. The service integrator also moderated Beta's sales processes and target market selection because of its dual role as a customer and competitor. Delivery and implementation took place by the integrator Alpha, which also facilitated Beta's access to another important value network actor, the turbine manufacturer Epsilon. Epsilon, in turn, can express its possible requirements concerning the offering and willingness to apply it later on.

Table 4. Network actors participating in defining the business model elements of the Delta case.

Business model element	Actors influencing element	Drivers for developing the element	Actions taken
Internal structure	Customers	Increasing demand for large service entities.	Starting cooperation between business units and technical areas.
	Business units	Internal coordination needed to provide turn-key service and increase sales	Different technical areas and business units in different locations coordinated in a new way in order to maintain the customer relationship throughout the project
	Sister companies	Existing capabilities inside the group	Deciding which capabilities needed in-house and which acquired from sister companies.
Offering and development process	Customers	Match to customer needs Small customer organizations preferring one supplier	Designing an optimized combination of services for customers Turn-key service and service package development
	Business units	Offering together a service package	Joint development of the service package.
Sales process	Customers	Match to customer needs Need to keep the customer and grow sales	Coordinated sales processes between the different units according to customer needs Selling services of other business units as well
Value network and channels	Customers	Customer preferences	The partner selection according to the customer budget
	Suppliers	Outsourcing decisions at Delta because of customers' own service organizations.	Sub-contracting of electrical grid planning and design
Delivery and implementation	Business units and sister companies	One entity toward the customer	Coordinating the delivery of each module or service

For Delta, the company's internal network in terms of its various business units and sister companies was extensively used for coordinating the know-how when compiling the wind power services. In line with that, understanding and forming a match to the customer needs directed the compilation of the firm offering. Integration of the internal units is crucial in order to provide a consistent wind power profile for the customers. The customer preference for a comprehensive service package and turn-key service also required turning to the value network, thus outsourcing certain capabilities.

In spite of the slight differences in the way the network influenced business model development and implementation at Alpha, Beta, and Delta, all in all the network actors were involved to a great extent in defining each other's business model elements. These three firms were part of each other's networks. In addition, they were actors that had significantly included end customers, other suppliers, and partners and public institutions in their service portfolio and solutions development. Table 5 below sums up the results of the Alpha, Beta and Delta cases.

Table 5. Summary of network influence on business model development in service firms.

Business model element	Actors influencing element	Drivers for developing the element	Actions taken
Internal structure	Customers Business units Suppliers Sister companies	Size of customer organization More efficient use of in-house capabilities and resources Suppliers' and sister companies' capabilities and resources	Combining the capabilities and resources of different actors in-house Co-development in-house Outsourcing of expertise or hiring new expertise Adding interfaces between actors in-house Starting new kind of project cooperation in-house Learning new ways to coordinate actors and projects in-house
Offering and development process	Customers Business units Suppliers Consultants Universities Government/ The funding agency for innovation	Customer needs and requirements New joint offerings Enhancing cooperation and avoiding competition Matching resources Increase in knowledge New service innovations	Co-development with various actors Modularizing of services Developing service packages and portfolios in cooperation Organizing research projects Applying funding from the agency
Revenue and cost mechanism	Customers Government/ The funding agency Suppliers/Partners	Customer requirements Enabling wind power development High development costs Enabling win-win situation	Sharing risk and costs in new ways Increasing efficiency in performing work, e.g., through process development Added value as the basis for sharing margins
Sales process	Customers Customer/Partner Suppliers	Existing customer-supplier relationships Input in development process Different ways to acquire solutions Project "ownership"	In joint bids, sales process taken care by the actor with existing customer relationship Customization of sales process Making agreements on joint bids to provide compensation for input in development Actor initiating the project takes care of sales process Coordinating sales in-house Cross-selling of services
Value network and channels	Customers Customer/Partner Suppliers	Need for efficient and effective service channel Need to balance with cooperation and competition Structures of wind power project organizations Need to include other actors in network formation	Building a network on the basis of amount of value to the customer and/or different project organization models Carefully considering with which actor to cooperate and how Joint establishment of relationships to third parties Deciding on sub-contracting instead of in-house service production
Delivery and implementation	Business units and sister companies Suppliers Customers Customer/Partner	Smooth implementation of joint projects One entity toward customers Separate capabilities Solution of one actor embedded in the offering of another actor Customer's own scope of services differs	Joint planning of delivery and implementation processes Coordinating the delivery of each service and service module Separate service deliveries by actors Actor implementing the solution varies depending on project organization Erection provided as option performed by partners

Table 5 demonstrates that the network actors influenced on development of various business model elements: (1) internal structure of the focal firm, (2) service development process and offering development, (3) revenue and cost mechanism, (4) sales process, (5) value network and channels, and (6) delivery and implementation of services. *Customers* and *suppliers* had influence on each element. *Business units* had a strong influence when developing the firm's internal structure. They similarly contributed to the service development process and offering development. Delivery and implementation elements of the business model were also influenced by business units. The influence of

the case firm's foreign *sister companies* was remarkable especially on the firms' internal structure, as well as the delivery and implementation of services.

The funding agency for innovation contributed especially to the service development process and offering development. *Government* was involved in defining the revenue and cost mechanism through their decisions on the tariffs ensuring project feasibility. Also Finnish *universities* had a role in the service development process through students, who conducted research as part of the development.

The drivers for the development of the internal structure in the focal firms included customers' internal structure, as well as the capabilities and resources of the various network actors. Customer needs and requirements, increased knowledge, initiation of joint offerings, and the funding provided by the network actors formed the drivers behind the service and offering development. The revenue and cost mechanism development was driven by the customer requirements, high development costs, and a need to share the margins in a fair way with the supply partners.

The sales processes were influenced by the network actor relationships: in each case they were led by those actors with an existing relationship to the customer and in new projects one actor was in charge. Furthermore, sales process of the focal firm was influenced by the partner involvement as the new customers had to be jointly approached. Who actually was the customer or the final decision maker was not always straightforward and created a need for adaptations in the sales process. Value network and channels were developed in response to the customer needs and to balance between cooperation and competition. The need for smooth joint project implementation and separate capabilities of service providers and capabilities of customers affected the service delivery.

The internal structure of the focal firm was developed through a novel type of cooperation and coordination in the network and by creating new combinations of capabilities and resources. Service and offering development was enabled by co-development between network actors, modularizing of services and building packages of them. Revenue and cost mechanism development required sharing of risk and costs as well as margins in new ways between the parties. Similarly, the new means to increase work performance were important. The sales process was developed through joint bids, project customization, coordination of sales between network actors, and cross-selling of services. The value network formed a basis for the value it provided to the customer. Actors carefully considered with whom to cooperate and how to avoid unnecessary competition. The decisions between in-house service production and sub-contracting led to changes in the value network. The service delivery and implementation was planned and managed through joint coordination.

6 Conclusions

This study focused on examining how business models with new services in their core are developed by business-to-business market actors in a networked manner and how these actors influence each other's business logic. Our findings based on wind power industry cases corroborated the view by Palo and Tähtinen (2013) that innovative models develop dynamically as a result of an intensive cooperation between the network actors. This provides grounds to extend the view on business models commonly examined from an individual firm's standpoint and suggests that, due to the high interconnectedness between the firms' models and network actors' mutual influence to the models, the use of a networked business model concept is appropriate.

The case findings also demonstrated that although network involvement was emphasized in the beginning, when the offering was defined the actors also participated in the business model development in other phases of the project (Tuli, et al. 2007). In addition, their contribution also went beyond the focal projects as the firms sought to understand better customers' and partners' future needs and capabilities and to look for new business opportunities.

Network participation was the most intensive in defining the service offering. It was guided by the end customers and suppliers and the customers' and partners' needs, requirements, and preferences. Together with the firms' internal orientation, they formed a main driver for the business logic change that took place when there was a shift from separate product/service offering to comprehensive service entity offerings. This implies that the logic change is not one-sided and evolves as interplay between the supply and the customer sides. This change, which is likely to bring resistance from the traditional industries (Morris, et al. 2005), has on the contrary been embraced by the customers in the nascent industry. It is also suggested that the extensive network involvement in service offering development can be traced back to the new industry, the network characteristics, and actor positions as well as to the nature of the offering.

In the networked environment the boundaries between the different actor roles were partially blurred, and therefore value chain thinking, where one actor would provide a clearly defined product to another actor and add further value, was challenged. As a consequence, a supplier was able to choose, at least in principle, between serving the end customer or the service integrator, who also was its direct competitor. The cooperation with the latter required precise coordination when the offering was developed, highlighting the customer role as a partner (Kindström 2010). On the other hand, the end customer's in-house service production had the power to make the supplier relationship redundant. Therefore, we argue that a firm, regardless of its position in the network, has to consider the business logic of other actors in order to continue operating as part of the network and in relationship with each actor. This requires balancing between the firm offerings and defining clear roles as pre-emption for rivalry.

Service innovation as a core offering was another factor driving network involvement. Creation of service modules and packaging offered flexibility, and the customer/partner could choose a fitting combination. In addition to the existing ones, the actors created new services and bundled them according to the market needs. In addition to the

existing offerings, service innovations in the case companies varied from services that were new to the companies and the markets to service process innovations and even to the paradigm change as the services and technologies that were previously offered separately were now combined into one turn-key service (Bessant; Davies 2007).

Furthermore, the flexibility concerning the service offering responded proactively to the need for modifications in new projects. In contrast to developing new models each time (Kujala, et al. 2010), the model components could be modified “on-demand.” Furthermore, it is suggested that the traditional models of service/product development (e.g., stage-gate) (Ardichvili, et al. 2003) should be complemented with a notion to the dynamic influence of the network actors when the opportunities are evaluated.

The new industry impact was associated with the service offering; the undefined or developing needs of the nascent industry actors required their presence and interaction between them when the offerings were defined. The other model components and their development – internal structure, revenue and cost mechanism, constellation of the value net for the delivery and implementation – were also shaped in cooperation with the network actors and impacted by the new industry. The study findings also suggest that firms’ internal networks involving business units or sister companies based in other countries had much influence on what was offered and how capabilities were leveraged in the wind power industry. Furthermore, new revenue models and cost- and risk-sharing mechanisms were tested and discussed by the network actors. By participating in defining the value offering, the network actors defined their own position and other actors’ positions in the value net.

We also argue that the business model innovation (e.g., change and extension on value creation and/or capture) is driven and preceded by changes in the business logic that the firm adopts and continuously revises. A central area, especially regarding knowledge-intensive professional services, is the creation of new capabilities – here, a firm relying on a networked business model is more likely to combine its capabilities with firms in the same network rather than hiring in-house expertise in each specialized area. When the network is missing a particular capability, inviting new members to join enlarges the network. Altogether, this enables a quick response to changes in market needs; without resorting to networks, firms in knowledge-intensive industries would easily be hindered by excessive learning curves.

The structure of the network determines what new opportunities emerge and are identified. We propose that this leads to a form of path dependence in which networked business models develop through joint iterations by member firms; however, as long as the system remains closed, the development of the networked business model is tied to the capabilities and resources of the members and its boundaries are therefore a result of these capabilities and resources. However, when new firms join, the opportunity space of the networked business model is expanded (given that it introduces new capabilities or resources). The efficient use of this expansion, nevertheless, depends on the firms’ abilities to comprehend the network as a whole and contrast it with external demand stimuli. This highlights the role of the resource integrator.

6.1 Managerial implications

From a practitioner’s perspective, a networked business model becomes particularly relevant when there are many contingencies between the offerings and other model components of firms operating in a certain industry or a nexus of industries. For the managers, recognizing and analyzing the business logic of other firms provides a point of reflection concerning the decisions on the business model.

First, the business models of actors who have or aim at establishing a business relationship can be examined from the standpoint of their model synchronization; are the components compatible in all their parts in an optimal way or can the partner suggest improvements that can benefit the relationship? The same applies to business model innovation; changing one component of the model can bring about changes in others, and the results with regards to other actors and their business logic should always be evaluated. This does not imply that a business should remain static, but an early assessment of the model can reveal the feasibility of the model and assist in finding its deficiencies in time. The assessment is especially important if the model realization is dependent on the critical network resources.

Second, in order to gain an understanding regarding the models and develop them further, firms should continuously seek feedback from their partners and customers. This requires maintaining active communication with customers and partners and to map previously unforeseen business opportunities, such as service expansions and networked offerings. The potential is easily overlooked without periodical status checks focusing on the opportunity horizon.

Above all, managers should consider the network’s value in a strategic sense – a source of resources, ideas, and new business opportunities (but also tension, coopetition, and complexity). The reconciliation of alternative business logic of different firms in the same networked business model requires care and attention, but the outcome is determined by strategic vigilance and the ability to coordinate the business model in the direction of market needs while maintaining a competitive advantage over rival networks.

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APPENDIX 1 Interviews conducted in the companies participating in service innovation projects

Innovation project	Company	Interviewee position	Date of interview	Total amount of interviews per project
Service portfolio for the wind power industry at Alpha	Construction, maintenance, and professional services provider (Alpha)	Business area director, wind power	2/19/2010* 11/25/2011* 12/11/2012*	10
	Alpha	Country manager	2/9/2010	
	Alpha	Business development director	2/15/2010	
	Alpha	Business unit director	2/15/2010	
	Alpha	R&D director	2/19/2010	
	Alpha	Sales director	9/4/2012	
	Engineering firm B	Divisional director	1/24/2012	
	Wind power producer	CEO	1/24/2012*	
Foundation solutions for wind turbine towers at Beta	Engineering firm A (Delta)	Project manager	9/26/2010* 12/12/2011*	6
	Technology firm (Beta)	Technology director	1/30/2012	
	Construction, maintenance, and professional services provider (Alpha)	Business area director, wind power	2/19/2010* 11/25/2011* 12/11/2012*	
Service portfolio for the wind power industry at Delta	Engineering firm (Delta)	R&D coordinator	1/28/2010	8
	Delta	R&D director	3/10/2010	
	Delta	Project manager	9/26/2010* 12/12/2011*	
	Delta	Divisional director	1/30/2012	
	Delta	Regional unit manager	2/1/2012	
	Delta	Wind power specialist	9/3/2012	
	Wind power producer	CEO	1/24/2012*	

* Same person interviewed for two projects in a single interview

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Customer-based value creation and productivity in service-related business models

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The shift from being mere manufacturers towards so-called producing service providers, also known as “servitization”, affects both the companies’ business models and it challenges their value creating system. This in turn means that service-related business model elements need to be detected and inserted to a comprehensive framework. Moreover, the contribution of those business model elements to the overall productivity of the services provided needs to be measured with the aim of emphasizing on those service elements with a positive ratio of outputs and inputs. Performance externalization and the deployment of new technologies are promising measures, as will be shown by a real-world case from forestry industry.

1 Introduction

In recent times, services take over an increasingly strong part of the modern economic value-added system of most European countries. According to recent studies, the contribution of services to the macroeconomic growth (Dauderstädt, Pfaller 2014) represents a large potential for economic growth. Exemplified by the economic growth of Germany, for example, this means that services account a growing share of GDP of almost 70% today, irrespective of the specific sector that the heterogeneous services are assigned to. Coming from this broad perspective, those macroeconomic results also provide some idea of the particular meaning that services do have for singular companies. “Servitization” can be used as an umbrella term for the increasing importance of services for formerly manufacturing companies that are on the way to transform towards so-called solution providers. Those solutions – or hybrid products – mostly contain a mix of services and products that are bundled together. In modern life, services and the associated use of technology and digitalisation takes over a huge part of the actual value creation processes. This applies to the B2C, and also to the B2B business area. A taxi driver will more frequently use modern communications technologies in order to best fit to his customer’s needs (fast and convenient transport of passengers). And a formerly manufacturing company will shift the portfolio it offers to the customers in a B2B-context more and more towards hybrid products and services that rely to an increasingly large extent on services (supported by digital elements). In the consequence of those game changing developments (Servitization and digitalization), the established business models – especially from manufacturing companies which we emphasize here in this paper – need to undergo incremental changes in order to still fit the customers’ needs, and to redefine the roles, duties and contributions of customers and providers to the service delivery. This again has got a strong influence on what is called service productivity. Questions arise, about what specifically value (and output) of services and hybrid products offered to and co-created by the customers is, and should be. At the same time, “cost-effectiveness” and “productivity” of a whole business model can be defined by “more than the sum of its parts”. Therefore, effective and efficient measurement systems need to be deployed in order to continuously (re-)define the measures taken within the elements of a business model. Thus, for example, the use of technology as well as the steering of customer interaction can be efficient for enhancing productivity.

2 Particularities of business model framework for Services:

In this chapter, we will introduce what we believe that a service specific approach to business model development should look like. This implies that we will present what elements such a framework should include, and which steps need to be followed in order to realize an efficient and effective (and thus productive) business model.

By providing these insights that result from literature studies about business model development as well as practical case studies (Neuhüttler/Meier/Stadie (2014), Forthcoming.) we want to give appropriate guidance for companies that struggle with the development and/or the integration of service specific aspects in their business model (in the context of “Servitization”). At the end of this paper, we will provide a (partly real-world, partly fictional) case study from a manufacturing company that has successfully integrated those ideas by introducing a) a service specific business model and b) improving service productivity at the same time by setting the focus on the (specific customer groups and their potentials) and integrating technologies in the services offer portfolio.

2.1 Phases for the Development of a service-specific Business Model Framework:

The transformation for a pure manufacturer towards a company that focuses more and more on services needs systematic support. When new business activities in the service sector are increasingly carried out in such companies, this business area should also be systematically developed. Needless to say in that context, that a business model is

always the core of business activities. Also the development of a service specific business model can help to systematically develop services according to the companies' goals, strategies, and customer segments.

In order to develop such an adequate business model that meets the service specific requirements, we first propose a step-by-step-procedure, accompanied with suitable measures and methods that are helpful in each phase. Since we are focusing on customer specific aspects (and the business model element "value proposition" that can be supported by technical features, see also: case in chapter 3), we present an overview of each of the phases that we think are important for developing a service business model, and we will present the phase about the customer centered management aspects in more detail. Second, we will introduce, of which elements such a business model framework consists of.

1. Idea- and Integration Phase

The process for developing a service specific business model starts with the Idea- and Integration Phase. It serves for the definition of what long term goals the company seeks to follow with the service provision on the market. In this phase, the idea of the service business model (BM) should be integrated in the overall corporate mission of the company. The mission of the service BM should answer, which core competences are existing. Those have to fit with the company's values and should be aligned with the future vision of the company. The service specific vision should thus also describe a realistic, and future oriented picture of the company. For example, it should describe, how the future of forthcoming generations will be improved by the utilization of the service offer.

The service strategy development serves to determine the possible customer needs, the competition, the type of strategy which should be focused, and the critical success factors. Methods that are supporting this phase could be: the scenario analysis, the 7-S-Model, the formulation of a BCG-Matrix, and a Product-Marketgrowth-Matrix (according to Ansoff).

The description of the actual value proposition and thus the benefit for the customer in utilizing the service offer should be early described in this phase. It should be focused on potential problems of the customers, which can be solved by the proposed service. Methods in this phase could be the adapted use of the (service) value chain (according to M.Porter), the Blue-, Red Ocean Strategy, and a SWOT analysis.

2. Concept phase

In the conceptional phase, more concrete decisions are made concerning potential customers, an efficient value creation management, and the financial management of the service idea.

a. Customer Management

The future customers are a very crucial part of the service business model and as such, this element should be prepared very thoughtfully.

The future customer segments and their specific needs should show a high accordance with the goals defined in the previous phase. Furthermore, those goals should be reachable (realistic) and the service offer should clearly focus on the goals and customer needs. It can be helpful to undertake a segmentation of customer groups (B2B, B2C) in order to elaborate the specific needs more precisely. Methods that support those activities could be a Target Group- and Data Analysis, and Data-Mining.

The customer relationships are a crucial factor that should describe, how initiation, stabilisation, intensification and the revival of the customer relationships can be analysed, planned, performed and controlled. In this phase, mostly the relationships towards the previously defined customer segments are of great importance, and also measures for acquisition of new customers, for customer loyalty and retention should be defined. Those could possibly be reached by the differentiation from the service proposition of competitors; early setting of service standards and guarantees, price bundling, decisions about individual customer performance, and the way, the customer will be integrated in the service performance. For customer retention, service innovations and value added services could be targeted measures.

Supporting methods in the context of building customer relationships could be the Customer journey, the Service Blueprint, the development of a Customer Contribution Margin, the Share of Wallet, Customer Lifetime Value and the Customer Revenue.

The customer channels again define how the company seeks to reach the previously defined customer groups and which communication channels are used to transmit the value proposition to those customers. Especially in this phase, the service specific characteristics (intangibility, integration of the external factor, etc.) should be taken into account. The communication channels thus need to be congruent with the customer segments, the market and the goal of the company, the information technology that is available for communication with the customers, and the value proposition as such. It is important to make sure that it is able to access the performance components properly. In a service business model those targets should be already defined. For example, demand-based targets such as the presence and accessibility (distance to a local office), the possibilities of access for the external factor (shuttle towards the transportation center), and the time period, preparedness and reliability of delivering the service (pizza service that only delivers a certain region, but guarantees to deliver the full menu and to deliver within a certain

time period after the order). Again, in this period, the Customer journey and the Service Blueprint are helpful methods to describe and to evaluate the goals and measures.

b. Value Creation Management

The value creation management describes basically, which key resources the company would like to use in order to realize the business model and the respective service value proposition. The focus in most service related BM is likely to rely on human capital (personal) resources, however, also diverse material (physical) and nonmaterial resources such as technological competencies and capacities or further service relevant components that should be integrated in the planning of this phase. Again, the definition of Critical Success Factors and of the resources (including already the teams/staff allocation) is necessary.

Also, the core competencies needed to be able to perform the service, for positioning on the market and to build customer relationships should be defined in this phase. A business plan and project management (using a respective tool) brings an overview, and Critical Success Factors on the basis of a BM performance Scorecard can indicate how can indicate how they might be proactively used.

The key partners in the value creation network are now to be determined. This should include the test, which service components can be performed by the provider itself, and which components should be outsourced to a network partner. In the example of a carsharing provider, the energy supply could be performed by a network partner. Methodologically, the screening of suppliers and other key network partners is useful in this phase.

c. Finance management

This part of the BM Development is in charge of all measures starting from the capital procurement until refund. It thus comprises the entire design of relations regarding payment, information, co-determination, control etc. with investors. A capital model should thus be generated to secure liquidity.

The cost structure is a central component of the BM, since the most important costs of the service proposition are defined here. Those can arise for example from the previously explained BM-components (customer- and value creation-related). Since each BM contains individual cost- and value creation structures, the costs may highly vary. Methods that are helpful to identify the arising costs, the financial Key Performance Indicators (KPI) and the Critical Success factors, are: the resource costs analysis, capital requirements calculation, the liquidity planning and the comparative cost analysis.

In order to fulfil the goals of each business activity, the revenue structure must be best described in order to reveal the most possibilities for revenue generation via different ways. Therefore, cost-covering prices have to be fixed in order to substantiate the value proposition, like for example a carsharing utilization fee.

3. Test- and Implementation phase

Pre-tests help in this advanced phase of the Service BM Development to figure out, whether the BM is realistic and ready to be implemented and applied in the market. It is important to test in this context, if the developed value proposition is being clearly explained and will transmit this message to the potential customers. This can be done by using specific infrastructure like the ServLab, a high-end laboratory specifically developed for testing and improving services, which contains a huge methodological toolbox, or by simply using online technologies like Second Life. Activities in this phase could comprise the formulation of the test aims and strategies, the planning and design of the test and the testing itself, and finally the completion and evaluation of the test. In parallel, the testing should be documented (Burger, 2012).

4. Monitoring and Control phase

In this phase, the assumptions, goals and success factors that have been specified mainly in the concept phase (2), have to be contrasted with the defined KPIs to monitor the BM performance. A comprehensive overview of possible KPIs to be used for this can be found in the Productivity toolbox which was developed with the involvement of Fraunhofer IAO and 33 German joint research projects in the course of the meta-project strategic Partnership "Productivity of Services". Another possible method in this context could be the use of the Business Model Scorecard, which was also developed by Fraunhofer IAO.

The previous paragraph is based on: Neuhüttler/Meier/Stadie (2014): "Dienstleistungsorientierte Geschäftsmodelle entwickeln - ein Leitfaden für KMU." 2014, Forthcoming.

2.2 The service-specific Business Model Framework: Elements

When a company that wants to develop a service specific BM has successfully passed through the phases described in the previous chapter, the resulting BM should give a clear overview of what elements are important for the respective service(s). Thus, the most important elements of such a BM are shortly described in the following. An overview of the generic (and adaptable) BM Design Framework can be seen in the following figure:



Figure 1. Business Model Framework for Service Companies (Neuhüttler/Meier/Stadie (2014).

The core of the BM is the value proposition, which is developed in the first process step (1) and permanently re-developed by taking into account the specific requirements of the involved partners and customer groups.

The BM elements like the cost structure, the finance perspective and the revenue perspective are crucial for service performance/productivity, as has been seen in the process description (see: chapter 2.1, phases 3 and 4). Likewise, the internal value creating perspective, including the key resources and activities play an important role for the value creation process. Furthermore, the external value creation perspective, which comprises the analysis of customer segments, customer relations and –channels as well as key business partners play a non-negligible role in service-performance-related considerations (see: chapter 2.1, phase 2). The whole system is impacted by the competitive environment, an external system that can be described by factors such as stakeholders, competitors, politics, or market regulations, etc.

That is one reason, why performance measurement via KPIs plays such a paramount role for each of the BM framework elements. In the following chapter 2, we will describe to what extent companies are ready to use those KPIs and which KPIs are estimated to be critical for companies. Furthermore, we show the current challenges, potentials and future needs for action for the use of KPIs in order to improve service productivity and the respective business models.

The previous paragraph is based on: Neuhüttler/Meier/Stadie (2014): "Dienstleistungsorientierte Geschäftsmodelle entwickeln - ein Leitfaden für KMU." 2014, Forthcoming.

3 Productivity measurement in Research and Practice

As mentioned before, the measurement and steering of service productivity is estimated to be crucial for the success of a service business model framework and thus for the services proposed on the market. Both, activities in performance measurement and business model (re-)development are usually established on a very strategic level in practice. This reaffirms that both, business model development and productivity measurement, are considered critical for success. As such, they are most important issues for the companies' present and future development. Events within the corporate environment that have an influence on the strategic business model development most possibly do also have a strong, significant influence on the corporate performance and the associated performance measurement systems. Nevertheless, only few companies do possess a structured way of dealing with questions arising from those issues. Dealing at the same time with service-specific business model (re-)adjustments and with performance and productivity issues implies the integrative development of overall measures.

This already became apparent in the year 2010 when Fraunhofer IAO conducted a short study among industrial companies about service productivity. The results showed that at that moment about one quarter of the respondents did not use any service productivity measurement. On the other hand, more than half of the respondents would use specific KPIs in order to measure their Service Productivity. The growing share of services in the business model was reported as one reason for productivity measurement. Further reasons mentioned in that context were the increase of competitiveness, innovation and quality (Kicherer et al., 2011).

Those results could be reaffirmed by a short survey that was conducted in 2011 among 61 stakeholders from the service research community. It revealed and again strengthened the assumption, that service productivity is mostly derived from the industrial productivity concept. As such, service productivity is largely understood as the ratio of output to input, under consideration of service-specific characteristics. At that moment in 2011, service productivity research was considered as a very young scientific area (87%). This fact correlates with research about service productivity being considered marginally more disciplinary (57%) than interdisciplinary (43%) and a little more general (56%) than focused on specific industries (44%). However, in view of the increasing number of publications within the service productivity area, it was concluded that the topic is significantly increasing in importance. The consensus among the respondents was that within different areas, the need for action is required. First of all, economy (37%) was considered as in high need for action, but also science (34%) and politics were deemed to have huge needs for more insights about service productivity (Mörschel, Kramer, 2011, whole section).

This requirement for better understanding what service productivity really means was one reason, inter alia, why the funding priority „Productivity of Services“ and the related meta-project “Strategic Partnership Service Productivity” were initiated by the Federal Ministry of Education and Research already in the year 2009. Consisting of more than 32 research projects, the Strategic Partnership applied a structured approach to improve knowledge about Service Productivity and to perform comprehensive cross linking of issues concerning service productivity with key issues of innovation management for services, as well as an advancement of the research policy centered discussion on the productivity of services. Organised as a public-private-partnership, the “Strategic Partnership Service Productivity” aims to enhance networking among all relevant actors from economy, research and politics. The Innovation Office of the Strategic Partnership has made it his task, to take a closer look at the development of service productivity research in recent years. Research activities and key contents, as well as their thematical and regional distribution were analyzed, particularly through publications. Thereby, key issues and research activities have been identified and it could also be determined, which areas have been little explored in current research.

In the next chapter, we will highlight which are the main challenges that companies, which are transforming from traditional manufacturing companies to service companies, have to face concerning service productivity.

3.1 Recent needs and emphasis on Productivity measurement: results of an empirical study

Due to the fact that services play an increasingly paramount role in the market, service providing companies need to focus on improving their service offer (using an adequate business model) and at the same time enhancing the service productivity. Increasing service productivity opens up potentials in many aspects: the (re-)definition of most recent fields of action, the critical analysis of service productivity-related approaches currently applied, or anticipating prospective activities, in short: all those managerial implications of productivity increases again disclose the potentials for service business model innovation of producing services providers.

In order to exploit the huge potential of increased service productivity, tools and concepts for the measurement and assessment of service productivity are required. Although companies from manufacturing industries greatly possess knowledge about productivity management in general, they often lack to transfer those concepts and instruments accordingly to the special characteristics of services (vgl. Janeschek et al., 2013). One challenge remains in the transmission and appropriate use of productivity-related concepts in consideration of the service specific characteristics (vgl. Ganz, Mörschel, 2011).

In order to clarify which current state of knowledge German companies do have about the issue of Service Productivity and which key levers are still needed for implementation of further solutions, an empirical study was performed by the Institute of Human Factors and Technology Management IAT, University of Stuttgart in 2012 in the context of the joint research project “ServUp”. One of the goals within „ServUp“ was to capture service productivity in a systematic way and to combine practical knowledge from the companies involved, and theoretical aspects such as the results of studies etc. Also when asking companies about the extent, that productivity-related issues are integrated in the strategic and operational planning and monitoring activities, interesting results can be found. Productivity seems to play an important strategic role for companies, as it is also described in the business model framework in chapter 2. But when it comes to the effective application of Service Productivity measures, companies still seem to struggle. In the following, selected results from a broad study are presented, that give insights about the current state of knowledge about service productivity and that reveal starting points for service business model implementation. The aim of the study was to mostly reach companies from manufacturing industries, and deliberately extending the scope to companies from other industrial sectors. Therefore, the target group comprised 1000 companies from capital goods industry, industrial goods sector, consumer goods sector, and from other manufacturing industries. The companies were addressed via letter, email, and an additional online version of the standardized questionnaire. Amongst the 103 responses, in total 90 were fully valid and thus included into the study. Those applicable responses came from business representatives at executive positions in business segments like Service Management, Controlling, Information Technology, or the Executive board.

In the following, the survey results about managerial implications of productivity within the manufacturing and service area will be presented. Those give insights about the main challenges and needs for action, the approaches about

managing service productivity that are already applied in business and prospective opportunities and activities in that context.

The majority of the companies confirmed the growing significance of service productivity for the respective area. In doing so, more than two thirds (71%) of the respondents considered service productivity a relevant issue, 39% of them even considered it to be of particularly high importance. This growing relevance of service productivity can be related to the increasing significance of services for the company's portfolio turnover. Responses to another question in this context indicated that the average share of services for the total company turnover grew by 8% between 2007 and 2012, whilst the service turnover grew by 20% within the same five years. This increasing importance of service productivity could allow the conclusion that service business models (frameworks) are of great need and importance for companies that want to systematically develop their service portfolio successfully.

Another interesting fact can be derived from the study, when the respondents were asked about the service dimensions recently focused the most, and where they currently estimate the most need for action. The majority of those cumulated answers showed, that "Quality" (31%) and "Customers" were the most emphasized dimensions. The highest needs for action were identified in the area of process- and customer focused elements like as "Integrating customer requirements into service engineering processes", "Controlling of interaction processes with partners or customers". With reference to the above described, elements of the business model framework, those statements again emphasize the high coincidence to the business model elements. Especially customer related aspects seem to have both a strong influence on service productivity improvements, and play a crucial role for the development of service specific business models.

When being asked about the approaches for managing service productivity that are currently applied, the respondents gave interesting insights about the organisational level, the data about service productivity is collected. Service productivity is mainly scaled on an aggregated level rather than on a level of single employees. From the 57 answers 20 respondents stated, that they measure productivity only on the level of the whole company 17, that they measure in the level of business divisions (13 respondents measure productivity of their services on a team level and only 7 for every employee). This could be interpreted as an indication, that companies have not yet fully exploited the potentials that rely in services and their productivity and maybe, they lack of the respective business models in order to do so.

The relevance of different measuring objectives is evidence that reaffirms this idea. The respondents rated on a five-point Likert scale (1=highly relevant; 5=highly irrelevant) that first the measurement of the profit margin (1.7) and second the "Integration of customer-related aspects" (2.1) and "Organisational aspects" (2.2) as well as "Resource capacity and allocation" (2.2) were the most ranked. "Innovation integration" (2.8) was still ranked rather relevant than irrelevant.

The challenges that arise from the measurement objectives within the context of service productivity proved to be "qualification and controlling of employees" (24%), "service standardization" (15%), and "service modularization" together with "quality assurance" (14% each).

Almost two-thirds of the respondents use the collected data about service productivity mainly to support the decision-making process. Thereby, KPIs support both, decisions on the strategic (29%) as well as on the operational level (26%). This is interesting, in that also the development of a service specific business model should be carried out by integrating those organizational levels. The remaining third of the respondents uses the service KPIs to manage development-related topics, such as "Resource development" (18%) or "Human resource development" (17%).

The majority of the companies use certain KPIs to quantify the productivity of their services. However, it still uncertainty exists about which KPIs should be applied in order to measure the service issue. It could thus be identified that companies rather prefer a dynamic and flexible adaption of KPIs to the service lifecycle than a static and one-time structured approach. As such, service-related KPIs can be developed by collecting data to meet customer and market requirements. The most relevant KPIs in monetary value turned out to be "turnover / return / profit" and "costs / effort / goodwill". In terms of non-monetary values, the most crucial aspects for service productivity appear to be "utilized capacity", "customer satisfaction", "quality / claims" and "time to react / time needed".

Asking about future needs for action, objectives and application fields for Service KPIs, the respondent emphasized on both, internal and external aspects. Similar to the basic goals of a service business model, also KPI-systems are estimated to be most important for the "Protection of competitive position and innovation ability" (21%), and for "optimising personnel utilisation" (17%).

Also, the answers about the future significance of productivity-oriented management systems (on a five point Likert-scale) were noticeable: more than 93% of the respondents estimated KPI-based service productivity management systems very important (27%) or important (66%). About 7% of the respondents had neutral opinion about this and none of the interviewees had the vision that Service oriented KPI Systems would not be of great importance in the future.

(the whole chapter is based on results of Neuhüttler/Meier/Stadie, 2014)

3.2 Example from practice: development of a service specific business model and simultaneous productivity improvement, viewed and executed by the two framework elements “customer” and “technology” within a case study from the forestry industry

The aim of the preceding statements about service business model development and service productivity is to support the successful transformation of manufacturing to service companies. We believe that this should be promoted by providing insights about necessary changes within the respective service business model elements. In addition, we think it important to conduct productivity increasing measures in companies transforming towards solution providers, such as performance externalization strategies or deploying of new service technologies. That is why in this chapter, the concrete premises and results from customer integration by technology use will be prospected for both, business model innovation and service productivity improvement, using the business case of a producing service provider from the forestry industry. The practical example results from the joint research project ServUp, which is a part of the aforementioned knowledgebase called strategic partnership “Productivity of Services”.

In the previous chapter 2, we learned that the core of the business model, the value proposition of a service a) differs in many aspects from the value proposition referenced to an industrial product. Therefore, it b) needs to ensure, that the service portfolio proposed will meet the specific needs of the customer. In our case, not only the willingness to perform the service to the customer, the so-called service readiness, is crucial but also the resources of the customer are required for service delivery.

Technology integration is one key lever to permanently (re-)developing new or to redefining existing services offered to the customers in order to meet the customer’s needs. In that context, the starting point of this development process is from interest: will technology be used in the very early stage of the development process, while the service business model and as a result the value proposition will be defined from the provider’s point of view? Or will technology be integrated within the already specified and established service offer in order to react to changing customer’s requirements?

In summary, it can be stated that for the (re-)development of a service business model as well as for the efficient and effective, and as such productive, service delivery the customer- and technology integration is an important lever. How the customer-focus and technology can be successfully integrated in a service-related business model, will be shown in the following.

In the following case study, we will describe the above mentioned correlations as clear and practice oriented as possible. The case – partly a real world scenario – originates from one of the 33 joint research projects within the German funding priority “Productivity of Services”, called “ServUp”. The aim of the project “ServUp” was to support the transformation of traditional manufacturing companies to service companies by providing insights about productivity increases which necessarily comes along with changes within their business model elements. As such, productivity increasing measures like performance externalization strategies or the application of new service technologies can be executed successfully.

In the case presented, we will focus on the maintenance and repair services provided by a manufacturer of machines for automated harvest and transport machines in the forestry sector. This very specific sector also being affected by the increasing service orientation (Servitization), the formerly manufacturer is on the way to transform into a solution provider, and service partner for its customers. To put it into another perspective, one could notice that the company is at the same time developing a new service business model in order to react on internal and external changes in the market. The reason: changes in the competitive environment, the technological progress resulting in an increasing similarity of the competing products (machines) on the forestry market, and changes in the customers demand asking for services and products from one single source. In order to ensure its competitive advantages, the forestry manufacturer thus decided to adapt its business model and to set a stronger focus on services.

The initial situation from the provider’s perspective:

both maintenance and repair are services that formerly were additions to the company’s standard product portfolio. Since both are product-related services, they were attached to the sold forestry machines in the past. As such those types of services were provided for free and did not obtain a lot of attention, neither from the manufacturer, nor from the customers. Since the forces on the market for forestry machines became increasingly competitive and the technology within the machines became more or less similar between suppliers, the services became one distinguishing factor for competition.

The initial situation (context) from the customer’s perspective: those machines are highly mobile and they are working in forestry areas (often mountainous, densely forested regions). Considering the case of a machine breakdown, fast access by another vehicle is not always possible. The forestry industry (customers of the machine manufacturer is a) highly capital intensive and b) depending on favourable weather conditions (no storms, no rain, no flooding, etc.) which will actually reduce the harvesting period. A machine breakdown in the best harvesting time means high capital losses for the machine user (customer of the machine manufacturer), since reactive repair and the provision of a replacement machine will take time.

The solution: The use of Information and Communication Technology (short: ICT) can lead to a new service business model, and the associated performance externalization strategy leads to more productivity for both, customers and provider. ICT was in this case used to create new service offers to the customers.

Technological point of view and service externalization: The provider started with transmitter modules that had been integrated within the customer's machines and that would allow to transfer defined data via satellite from the machine of the customer to the provider. Permanent and automated data monitoring and analysis allow the respective service manager or –technician to fastly react when the first signs of a possible breakdown appear. This again allows to the supplier the proposal of a preventive service offer that eliminates risks of standstills. As such, the main input factor for successful service provision is based on the data that the customer allows to transfer from its machines to the analysis systems of the provider. Even if a direct, personal relation only takes part while the Maintenance- or repair service is being performed, the use of customer data requires a good and trusting interaction. Thus due to the focus on technology integration in this example, the entity "customer" can be understood in the sense of (data) resources that need to be integrated in the value proposed by the provider and co-created by technically-enhanced interaction of provider and customer. This is considered under the premise that the emotional and relational customer experiences only do play a secondary role in this case. When some data indicates, that the machine will soon require a proactive service visit, the service coordinator could make an appointment with the customer at a time that fits best for both. Still, the customer is needed to this process since only him has the right and detailed information about the real machine use (machine hours, but beyond that also how often, for how long and under precisely what conditions the machine has been used). Thus, effective and efficient service delivery still depends of the cooperation with the customer, which shows what extent the value co-creation is externalized to the customer. Service provision is thus based on the externalisation of data capturing towards the customer. This again requires a constantly and trustly cooperation in order to co-create the value those services provide.

The Service offer and –value proposition:

The aim for development of the service providers overall service portfolio was to evolve the product-related services from »reactive« services and toward »proactive« services. The innovative use of technology enables the provider to access machines' data. Early, real-time detection of situations and conditions that could lead to the machines' breakdown are made possible, even before the failure those conditions are leading to would occur. Appointments for preventive maintenance can be scheduled after consultation with the customer in order to avoid reactive, "after-the-fact" repairs.

Different types of value are proposed to the customers:

The customers are offered three types of value: restoration of machines' operational readiness following malfunctions/ breakdown (repair), assurance of machines' ongoing operational readiness and full productivity in use (maintenance).

Those types of value are bundled in three different service packages; the scope of services depending on the price, the customer is willing to pay.

For the service provider, these services require the provision of the technological and organizational basis for remote monitoring of the customers machines. This requires a precise data analysis and thus a deep understanding of the data provided by the systems (machines of the customer and data analysing systems). All data transmitted has to be properly examined for abnormalities (or possible signs for pending machine failure) and addressed via suitable measures, which requires expert knowledge. This data monitoring comprises new process steps which were not required when only reactive repair was offered. Since this is costly to the service provider these expenses have to be offset against the earnings the service yields. Thus, the business model of the company grants to pass on some of the costs resulting from the provision of the services (and technological and organizational basis) to the customers. Still those rates are low and attractive to the customers, since, as mentioned before, the reduced periods of unplannable machine breakdowns are more costly to the customers than the price for the proactive service offer.

Since the services »maintenance« and »repair« usually consists of customer-individual combinations of (sub-) services, the packages remain so flexible, that the customer can add sub-service modules or purchase a more comprehensive service package. To give an example of what those services comprise: the data analysis and the proactive maintenance service thorough the provider for the tasks of checking of engine emissions, checking of crane hydraulic systems and crane maintenance.

In general, the utilization of technologies in order to generate an innovative service value proposition is means a decreasing in the costs of service provision. Both, the customer and the service provider gain benefits. This again brings gains in productivity on both sides, which will be further described in the following..

Productivity gains for the provider – efficient use of resources:

Efficient – and thus productive – allocation of resources is the most important reason for the service provider. The challenges rely in the planning, management and accounting, and in the planning of the actual service provision in the field. Reactive services like repair rarely allow the resource planning in advance. Services like maintenance that are offered within the proactive service packages, allow to the service provider to plan the deployment of resources (Service technician, material, equipment needed).

Through rapid access to the customer data and the additional internal information, a service request can be completed rapidly by suitable measures via the staff of the provider. Standardized, technological infrastructure allows to the service technician (and the hotline agent who will plan the maintenance in coordination with the customer) to figure out which could be the best solution for both sides (provider and customer) in order to avoid a machine breakdown. In doing so, emergencies that require immediate action are markedly reduced. Complexity can be reduced to the staff involved, because less unplanned requests occur and the respective customer- and machine data is available. In this knowledge-intensive work environment also less time-pressure (when a sudden request occurs) leads to more staff satisfaction. And for the management in turn, this leads to better possibilities for personnel planning in advance since scheduling of the service provision as well as routing can be improved. From the providers point of view, in the provision of »maintenance« and »repair«, two roles are involved: service coordinator and the field-service technician.

The workload and availability of the latter depends on customer demand. The service coordinator will traditionally be charged with planning, coordination and management of HR (service technician) resources, and accounting. His work tasks will change slightly when proactive planning is introduced, towards reviewing and analyzing the data of the customer's machines which also means to review the current usage periods (»machine hours«) in light of those data in order to get an overview of what is the current status of the machine and the lifecycle of the components. On the basis of these data, if necessary, possible proactive measures can be derived and proposed to the customer. Finally, the use of technological infrastructure utilizing the data from the customers makes it possible to partly automate and standardize the service-related administrative processes as well as the service offer to the customers.

Productivity gains for the customer – savings in time and less cost-intensive breakdown-periods:

As mentioned before, the customer's requirements in the areas of both repair and maintenance will depend on his specific level of machine use; and maintenance intervals that are defined in terms of hours of operation. Since unexpected machine breakdowns can be very expensive for the machine operator (who is under great time pressure and pressure from his own customers in the value chain), avoiding of those incidents has the first priority for the machine users. The proactive service offer will increase the reliability of the serviced machine, since the service technician can even make some adjustments at the machine while operation via remote control (no on-site visit necessary). And this means a higher possibility of always working machines and thus, huge potentials for increases in the customers productivity. Even more, when a customer owns more than a handful of machines, what makes it difficult to keep on track, to keep the overview of use-periods and the machine data. Another fact that cannot be discounted is that the satellite control can protect the expensive machines against theft. It may happen that in unpopulated regions that are difficult to access, the machines can be stolen when drivers shortly leave them (to have a short lunch break, etc.). Productive work also requires specialized drivers of the machines. The data captured allows them to improve their own productivity. As they can read the actual production data and also alarm from machine part that are not working well, fast reaction is possible. And also the communication, since conventional communication via mobile phone is often not possible in their working environment amidst the forest. Inclusion of ICT within the proactive service offer (standardized interfaces, etc.) thus allows gaining many productivity increases via the automated data transfer on the customers' side. Rapid data access and permanent monitoring enables a fast completion of the service request if necessary. Shorter times of machine breakdown and stillstand are one result. And when an alert occurs, another important factor is travel mileage. Since the machines can be difficult and expensive to transport, the service technician and the driver have to agree on the exact place and time where the service would take place, as well as actual information of the machine use to enable the service technician to bring the necessary equipment (tools and spare parts) to the on site maintenance or repair. In providing his service, the formation of a more personal customer relationship through proactive cooperation is another advantage. The customer (service coordinator or driver of the machine) usually will have one single contact person that knows the machines and their history, and further circumstances that are important about the work if the customer (highly-productive areas and regions, where the driver might happen to work in the moment of an alert).

In conclusion, scheduled service provision reduces unproductive and unplanned machine breakdown times. The respective service appointments are agreed in advance by the service customer and initiated by the service provider. Even if the service provider will externalize some costs (payment per selected package) towards the customer, the latter profits strongly from the opportunity to generate productivity gains. Those rely in less production downtime and reactive repair costs that are comparatively more expensive to the service customer than low rates for proactive maintenance.

(The whole case is based on the description in: Productivity guideline: Productivity of service work, Rößner, Kicherer, Nägele, Quality and Service Management, Processes for improving the productivity of service provisioning)

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Life Cycle Business Transition through Sustainability Service Innovation Model

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Abstract

In order to sustain competitive advantage, manufacturing companies are expanding their value proposition by concurrently creating new products and co-innovating lifecycle services. They are expanding their value proposition multidimensional by concurrently creating strong potential through developing more sustainable customer-engaging products, co-innovating sustainable services together with their value network partners. Companies today are facing increasing complexity to execute profitably on continuous sustainable business transition. This article introduces a strategic concept, sustainability service innovation model, for utilizing sustainability as a business and innovation driver to facilitate the transition of industrial business towards the new service economy.

1 Introduction

In order to sustain or create competitive advantage, to grow and secure future, manufacturing companies are expanding their product offering to provide lifecycle services, too. By doing so, these leading companies are expanding their value proposition multidimensional by concurrently creating strong potential through developing more customer-engaging products, co-innovating services together with their customers and partners, and collaborating to create integrated new business models. Companies today are facing increasing complexity to execute profitably on continuous business transition. This paper will demonstrate that sustainability is not only the goal but also the means for achieving both tangible and intangible results. Sustainability is the ability to meet the needs of the present without compromising the future's ability to meet its needs. Sustainability services mean all activities (business & industrial) that help customers to be more sustainable.

Technology is enabling sustainability by facilitating compliance while simultaneously providing insights into process improvement and mitigating diverse business risks. Furthermore, forward-thinking business leaders are taking it one step further, deriving multidimensional business value as well as competitive advantage from the opportunities and innovations that sustainability challenges are uncovering.

Most companies do not have a strategy or analysis on aligning business to sustainability. Being green to achieve mitigation, clean to reach up to optimization and smart to manage the transformation is the integrated, evolutionary approach. Sustainability is an opportunity integrator on the path. Integrating novelty with technology brings new opportunities for more sustainable business models. The transformation towards sustainable business takes a long time and that is why it is important to fully understand the strategic concept, identify the key issues and harness the associated opportunities. From initial compliance or carbon footprint thinking, steps can be taken which can concurrently be used to optimise enterprise-wide business processes and perhaps even begin creating strategic differentiation and offering enhancement. When establishing benchmarks or KPIs to measure your progress on the sustainability path, it is good to select those relative to your company's priorities. Their wider context should be considered and integrated into daily decisions. Initial focus could be on internal issues such as energy savings, product life cycle or employee ethics and welfare, followed by focusing on external stakeholders such as the planet, supply chain partners and customers. The starting point is the business today and markets and the world tomorrow.

2 Relationship to Existing Theory

Sustainability is no longer a question of if, but of when, and to what extent it will impact a specific business sector. It is no longer a negative reactionary tactic to moderate environmental climate change, but a positive proactive strategy to accelerate long-term business climate prosperity. It is not just about risk, reductions, and recycling, but an industry-changing paradigm integrating innovation, differentiation and transformation. Antonio Tajani, EU Commission Vice President on Industry & Entrepreneurship stated "there will be no sustainability without competitiveness, and there will be no long-lasting competitiveness without sustainability. And there will be neither of them without a quantum leap in innovation." Eppinger (2010) has discovered that the link between sustainability and innovation is commonly mentioned, but not commonly made. Chesbrough (2003) points out there are a new logic behind open innovation which embraces external ideas and knowledge in conjunction with internal R&D. This offers a novel way of creating value. Miller and Langdon (1999) introduce how to manage disruptive innovation by managing platform, product and process innovation in continuous cycles. Nidumolu, Prahalad and Rangaswami (2009) explain widely why sustainability is now the key driver of innovation. Salminen (2008) has discovered that when new value for the customer is created in the form of a product or service offering and it results in sustainable innovation, it is essential to know whether there is also a transition into a new business model. At the same time the business innovation must be built on the essential business structures (operational systems, contracts, network structures, competence, etc.). Tammela and Salminen (2007)

introduce the interoperability concept through which common innovation of sustainable products and services can be accelerated by an open semantic infrastructure. The open innovation process requires the definition of interoperability in order to achieve a critical level of network dynamics to create new products and services. The Sustainability Service Model is created as an opportunity to build the missing links between sustainability and innovation. Skyttner (2007) introduces new systems theory with self-organization and evolution. Jamshid (1999) introduces that system thinking is the art of simplifying complexity. It is about seeing through chaos, managing interdependency, and understanding choice. Concepts are important to explain chaos. Tang and Salminen (2001) introduced the complexity management approach for the purpose of product and service management in continuous innovation. The key to open innovation is the integration of the customers and consumers' ideas into the process of innovation. This means that the creation of the innovation should come largely from the customer's input, ideas and feelings. This entails that the issue of trust is not uni-lateral, the customer gains trust from the service provider because of the interaction, but the company must first have trust in order to spend the money, time and knowledge on their open strategy (Belz, Peattie, 2010).

3 Research questions and research approach

The role of sustainability as a business driver is growing in industrial service business and has to be carefully taken into account in business transition. The opportunities of sustainability have not been understood in full context and as new service innovation. The main research questions are

- a) What does sustainability mean in industrial service business context?
- b) How to create business insight and business structures to support continuous innovation in sustainability services?
- c) How to manage the growing importance of sustainability in the business transition with a DNA model based on system dynamics?
- d) What type of sustainability service model and implementation process is needed in sustainable growth of business?
- e) How can the life cycle challenges of the customer process be managed in a networked environment?

This article introduces a new concept model for utilizing Sustainability 2.0 as a business and innovation driver to facilitate the transition of industrial business towards the new Service Economy.

This applied research was based on qualitative research approach. The study is based on concept creation according to combined industrial and research knowledge and case studies in real industrial environment at Fastems Corp., the life cycle care provider of industrial and intelligent automation systems and services, at Sandvik Mining and Construction Corp., the equipment and service solutions provider for mining and construction industries and at Tieto Corp, the IT system integrator and life cycle services provider.

The Sustainability Model was developed as a joint initiative between research institute experts and various international companies in Finland and was applied to individual enterprise strategies in order to validate how sustainability can be used to drive business value in the creation of new services. Insight into participant case studies will be provided to substantiate breadth of applicability and ease of use.

This applied research was based on qualitative research approach. The study is based on concept creation according to combined industrial and research knowledge and case studies in real industrial environment. The sustainability service innovation model was developed as a joint initiative between research institute experts and various companies and was applied to individual enterprise strategies in order to validate how it can be used to drive business value and how sustainability influences on business transition and how it can be managed. The intention has been to provide insight into participant case studies to substantiate breadth of applicability and ease of use.

4 Industrial Service Business and Life Cycle Care

The main question for service business strategy is the evolution of the customers' business. This means the changes in the customers' business should be addressed by the new service solutions. There are different market trends (e.g. technology, market and society trends) that are changing business. Companies competing within the industrial service business market should track the potential and business value that the customer may capture with the aid of services. Based on the expected business value, the concept of the service offering should be designed over the life cycle of customer process. Figure 1 illustrates the various types of industrial service business models through which a technology company can grow their business - ranging from product centric towards service and value centric.

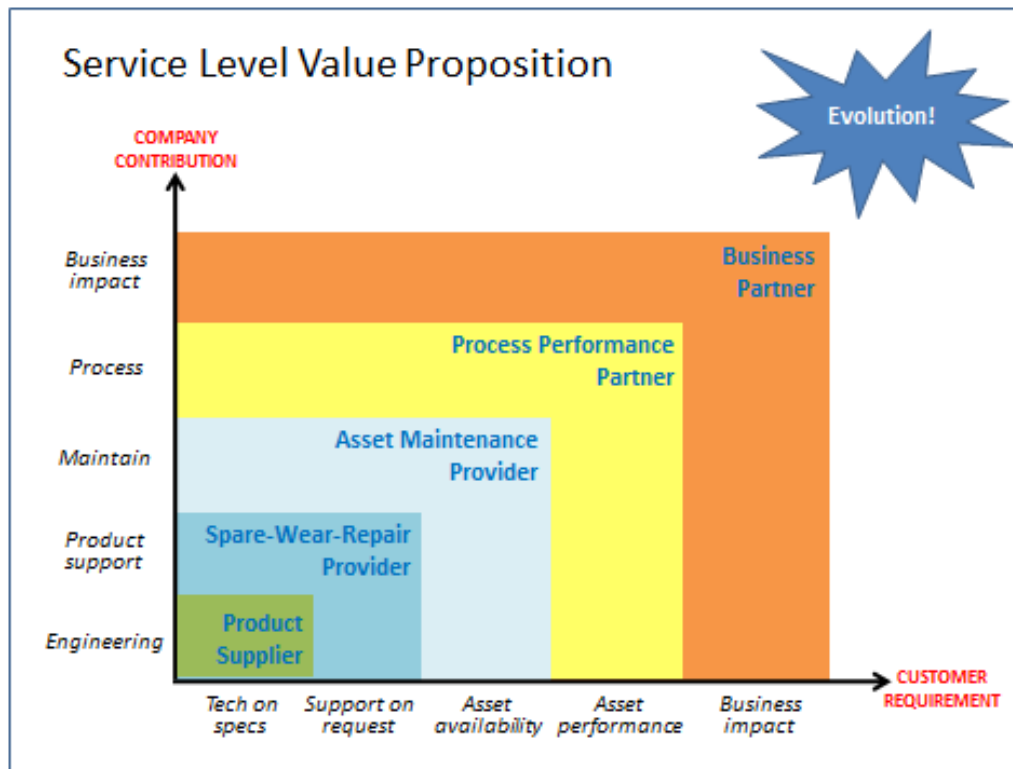


Figure 1. Business model dependence on customer requirements and value creation capability.

Each of these five business models has its own “mindset”. When a supplier (or service provider or partner) aims to proceed from one model to the next, it faces challenges, mostly in terms of getting the customer involved in this and developing its own technical and business competencies in order to achieve the new role. The strategic positioning decision between supplier and customer is important and has to be prepared as thoroughly as any other strategic decision.

The first two models focus on the supplier’s activities to support the customer’s investment and not on supporting the customer’s process. A spare-wear-repair provider needs the ability to understand and interpret the customer’s actual processes. An asset maintenance partner concentrates on professional maintenance management as a continuous process. As the process performance partner, the supplier can have a responsibility for the actual daily performance of the customer process. When the supplier is a business partner, it is involved in the customer’s value generation, e.g. producing optical cable in a cable factory at a given quality and price exactly according to market need estimated. The supplier needs to have competence of the customer’s business. The required level of knowledge and experience is such that it must provide the competence for productive communication between partners in the value network. During this type of business co-evolution the role of sustainability as a business driver in service business is continuously growing. It is important to outline the sustainability path (Figure 2) from supplier values through supplier business value to continuous customer value creation. Succeeding on this co-evolution requires continuous business, social and environmental forecasting and foresight as well as strategic business alignment related to changing requirements and multidisciplinary development activities.

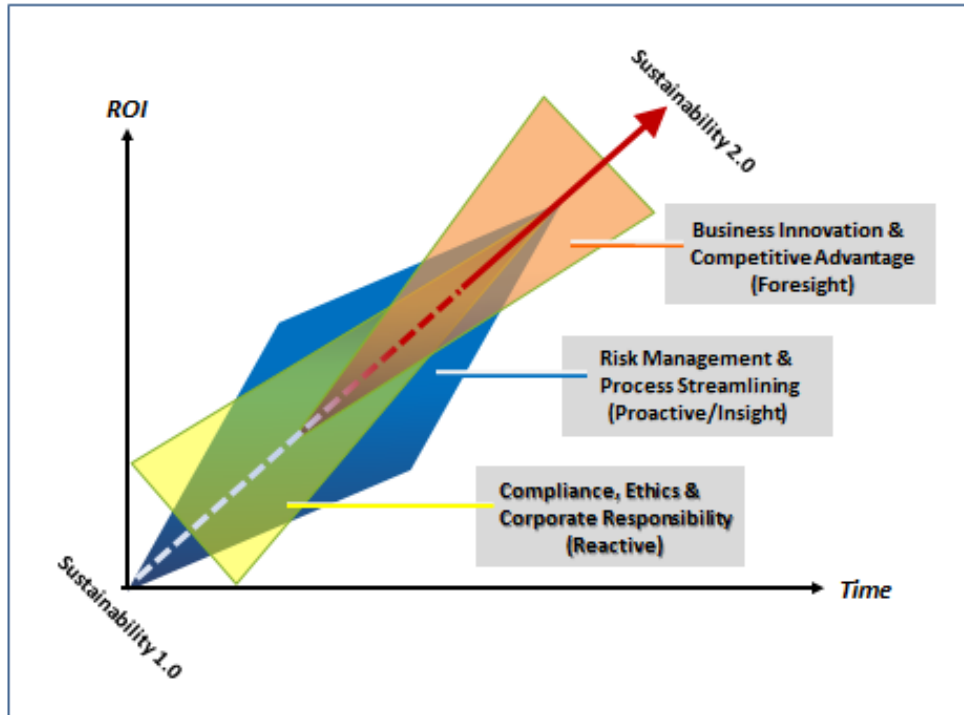


Figure 2. Outlining the sustainability path to customer value

Customer requirements and expectations on business value grow significantly the further we proceed as to the business model. Managing the network of partners involved in the business becomes more demanding and the level of knowledge intensiveness raises, too. In the business model on upper levels the integration of service and product is essential because of continuous analysis and expectations on raising the customer process performance. Type of complexity is changing when customer value is increasing and business model is changing. Dependencies are increasing on upper levels and management of complexity is focusing on dependency management. System engineering and dynamic markets have to be understood better to manage business co- evolution.

As an example, an asset maintenance partner offers maintenance services to support the products and application in its own installed product base. The objective is to provide higher product availability through lowering down time or supporting the application by proactive maintenance. The proactive maintenance is enabled by knowledge of products and application and monitoring globally the same kind of applications over their life cycle. The costs of maintenance can also be lowered in comparison with customer's own maintenance function. On the other hand a process performance partner offers process, energy and environment efficiency by taking care of some parts of the technical processes of the customer and ensuring high performance of these parts. Value is created in collaboration with the customer and thus seamless information exchange and joint processes are needed. The offering includes process availability and sustainability on certain performance level, performance data, forecasts, and decision support aids.

On a more sophisticated level, the industrial service results in increased customer process performance. The service provider is then responsible also of the sustainable innovation. Business partner represents a service centric business model. This is the case when the customer business value is based on the operation of equipment. As an extreme example, the service would mean to provide the desired outcome so that the customer does not even know what systems are used to produce the outcome, or where the outcome is produced.

The offering and sustainability enrichment is usually achieved by providing particular knowledge to other companies down the supply chain, in order to increase the value in the customer processes or products. Figure 3 shows, how the value proposition of sustainability is built on the result of network operations in value network.

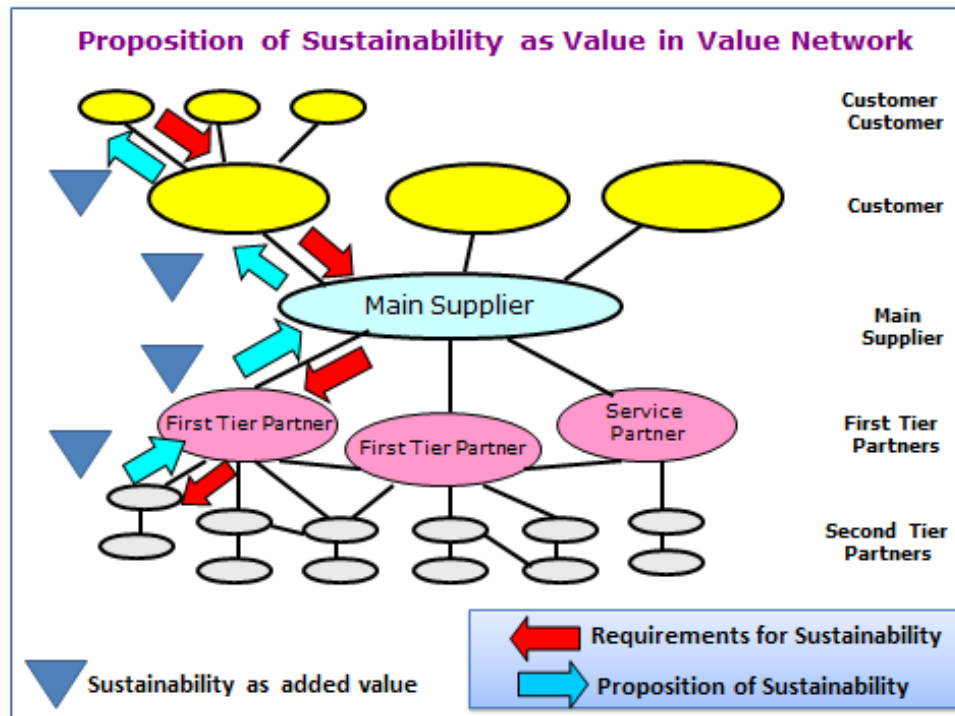


Figure 3. Requirements of Sustainability as Business Value in Value Network.

Competition happens not only between single enterprises but between networks of business. The partners in the value network have common responsibility on final customer process performance and its continuous development. Networked business means new ways for earning logic, too.

The requirements of customers and customers' customers have to be visible and well understood for whole the network to succeed in solution (product and service) development and delivery. As a result, companies are moving closer to or even into the operations of their customers, which requires a different organization approach and "networked thinking". A network in this sense consists of individuals and organizations with the resources they have, taking part in a process and thus interacting. This network perspective should already be implemented in the service development phase.

A well understood business architecture and structure supporting the selected business model is a very important strategic tool when business is evolving according to market requirements. Sustainability innovation needs new approaches and leads to business concept management. In the future, it will be possible and essential to sell business models based on the available architectural structure of a company.

Knowledge intensive business is in continuous evolution. Life cycle challenges can be faced and competitive advantage achieved in knowledge communities (Salminen, 2009). Increasing share of the innovation process is taking place outside the single company. In the global scale the information is available anywhere when there is internet connection available. The community shares the same information at the same time. The question is how to integrate and synchronize knowledge, technology, competences and processes, especially when creating something new in a networked environment over the life cycle of customer's process.

5 Generic findings

The business environment is influenced by a variety of economic and dynamic trends. The associated importance of sustainability is growing exponentially as a key business driver and it is an enterprise integrator to cohesively assess and align various stakeholder perspectives and requirements. Companies are often concurrently impacted by technological innovations, industrial regulations, and market transformation, amongst other factors. All these factors and trends add to the complexity of service and product development and make rapid new offering introductions even more important, and specifically ever more challenging. Sustainability focused companies, those able to manage these challenges and address the opportunities effectively and efficiently, are the ones which have a better position in dynamic markets in which internal and external players execute service development activities.

Business requirements can be integrated into corporate strategy by following a progressive sustainability path from 1) compliance, ethics and corporate responsibility through 2) risk management and process streamlining to 3) business innovation, differentiation and competitive advantage. This journey, from values to value, starts with reactive adherence and progresses through proactive insight and will eventually instill companies with the innovative foresight required to stand apart from their competition. As fewer companies on the Global Leader indices actually make tangible products, we see the majority of companies putting their R&D investments into services and innovating the way they do things,

not just the things themselves. Figure 4 introduces the continuous development cycle of the internal alignment and external positioning in sustainability service innovation. At first, sustainability can be seen as being a sustainable supplier. The focus is on improving internal sustainability in functional processes. Next level represents increasing sustainability in own products and services as new offering when becoming a sustainable solution provider. The leading edge in business is becoming as sustainable co-innovation partner with your customer and providing sustainability as a service.

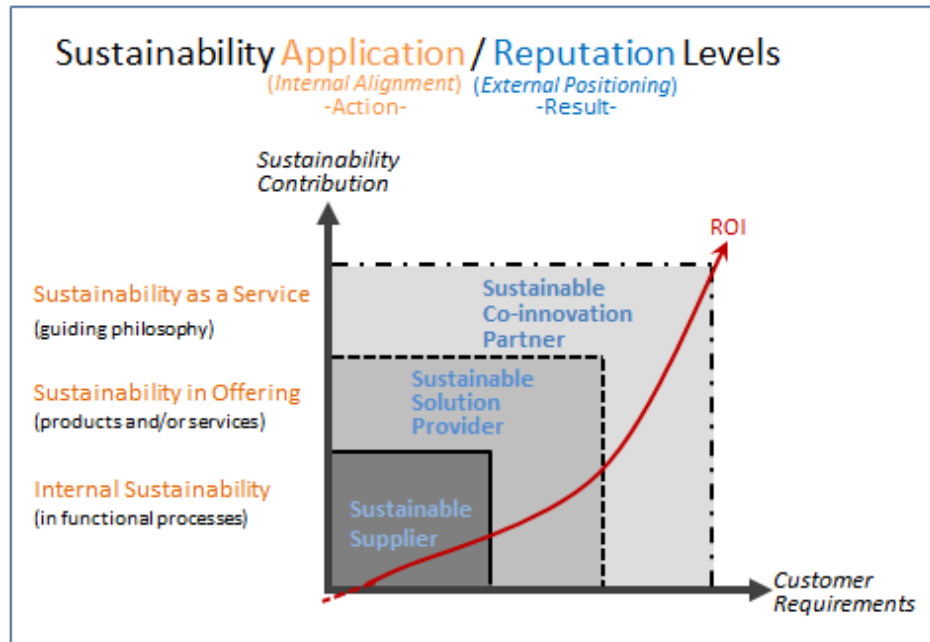


Figure 4. Internal alignment/external positioning in sustainability service innovation.

To be considered innovative, an offering must differ significantly from its predecessor. Figure 5 describes the trifecta approach in sustainability service innovation.

When we take the sustainability trifecta into consideration, economic sustainability factors give way to social sustainability implementation, enablement and engagement activities, and both of them benefit even further when combined with environmental mindfulness. It is possible to end up on process effectiveness (e.g. strategic, production), performance effectiveness (energy, resource use) or business outcome effectiveness (i.e., financial, product/offering, market environment, brand) by this approach.

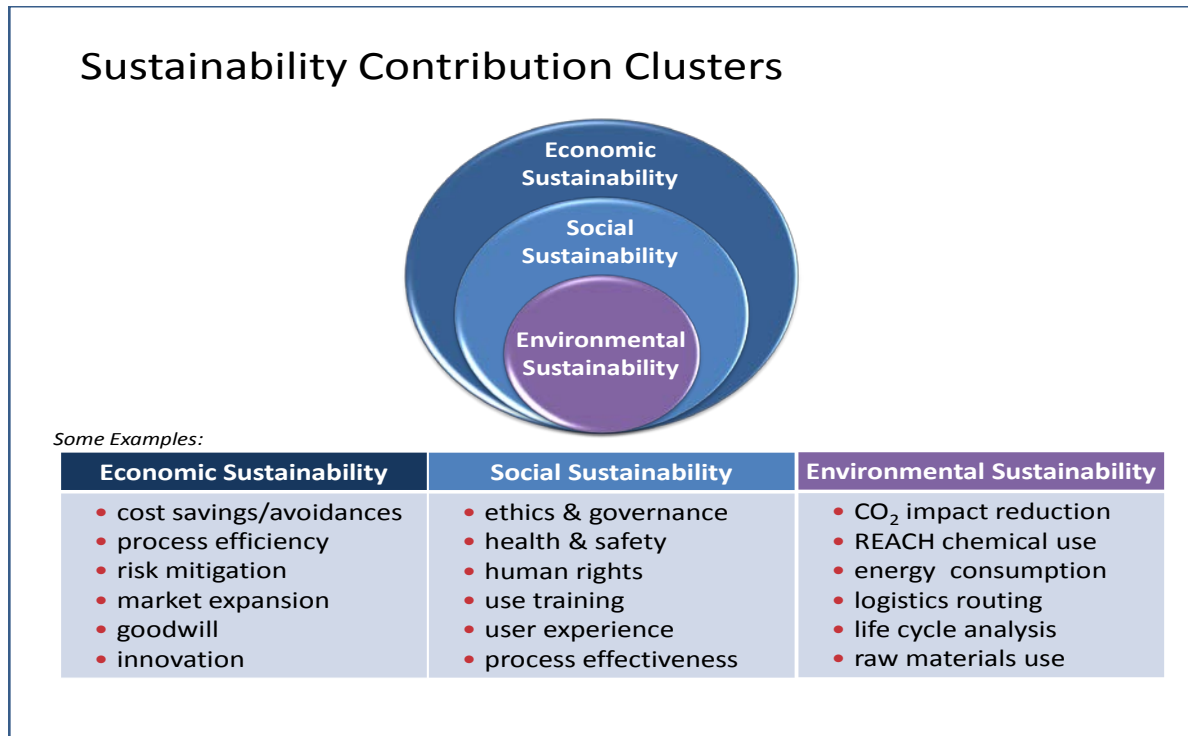


Figure 5. Trifecta approach in sustainability service innovation.

6 Sustainability Service Innovation Model

According to the empirical study of this research and the business knowledge gathered it was recognized that sustainability understanding and innovation in service design and engineering requires more systematics. The research group concentrated on building up an innovative and systematic way to manage the continuous increase of sustainability during business coevolution.

The Sustainability Services Model is the contribution from the research work. It outlines a 6-step systematic approach to integrating sustainability within a business, driving exponential growth and accelerating the path to ROI. The phases of the Sustainability Service Model and implementation process are (Salminen, Valkonen, Lindroos, Lukkari, 2012)

Step 1: Develop Services Category Lifecycle, Identify Sustainability Subcategories

Step 2: Brainstorm your Sustainability DNA Molecule by Sustainability Cluster

Step 3: Highlight the Sustainability Impact of each service category

Step 4: Plot Sustainability Contributions at the appropriate service level

Step 5: Identify Sustainability Relevance at each service evolution point

Step 6: Discover Sustainability driven Opportunities & Business Growth areas

At the **first step** the process starts by looking at the sustainability potential of existing service categories. It helps to highlight the sustainability impact of each service, and then plots the materiality of the sustainability contributions at each service level. Figure 6 describes an example of the categories of services with sustainability linkage.

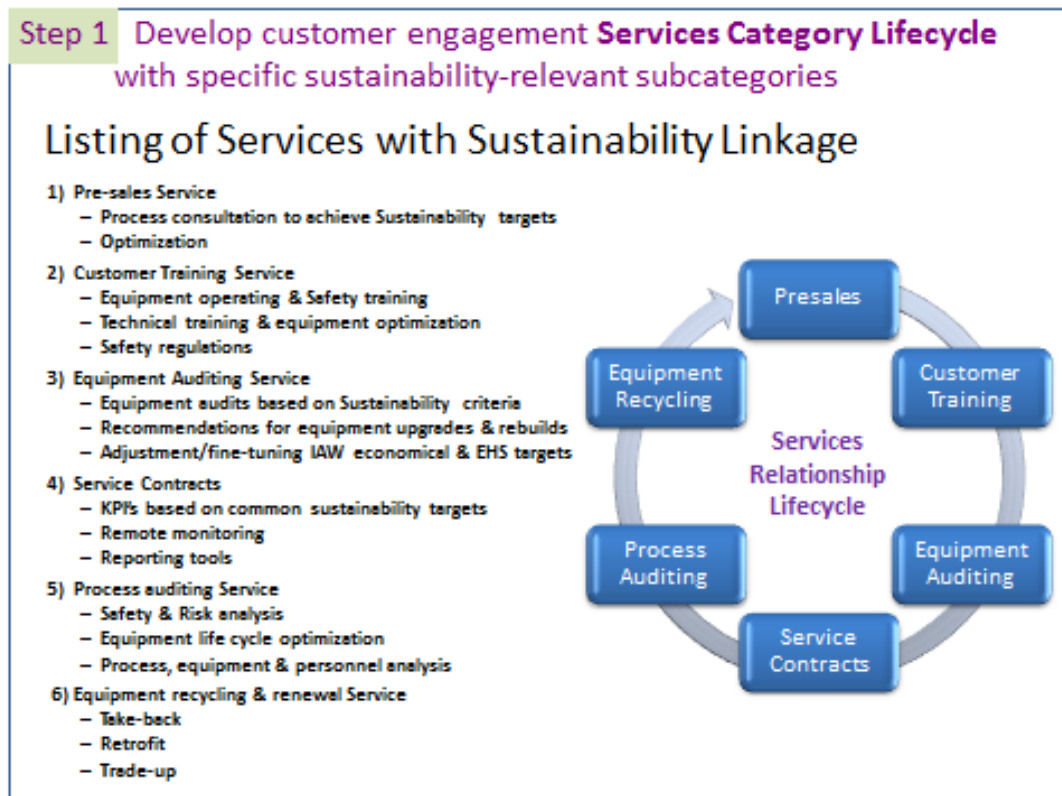


Figure 6. Categories of lifecycle services and identification of sustainability subcategories.

The listing shows current services delivered to customers today. The categories include elements that are bundled and sold as service to customers. For example, if we analyze service contracts the cost is very different if the number of KPI's followed is either small or high.

The process flow charting normally starts with high-level perspective followed by activity analysis to identify, which activities are really services. Then it is important to verify, what the sustainability related subtasks are in each service category. It is good to specify which are current or future services and which are company offered or customer required services. If the service is company offered and is not yet required by customers, it could be a differentiator in marketing. It might bring some new value for customers and also be worth higher price.

At the **second step**, the 3-way relationship, shown in Figure 4 (trifecta) is built as a system model with dynamic interrelationships. If it is applied conceptually to the business in value network (Figure 3), it shows the relationship map a company has with its employees, partners and customers. It creates a value network of authentic attributes, much like a DNA molecule does for an individual. The continuous evolution of the relationship turns employees into solution providers and customers into co-innovation partners, harmonizing internal alignment with external positioning to match customer requirements with sustainability contributions.

By identifying the sustainability relevance at individual evolution points, a company can discover sustainability-driven opportunities for service innovation. Figure 7 introduces the result in one company case study.

It is essential to identify the leading issues associated with each sustainability cluster element relative to:

1. How your business must respond to sustainability (main challenges, risks, compliance issues)
2. How your business can capitalize on sustainability (main business, growth, market development) opportunities

It is important to understand the relationships between services and how you execute the customer service by internal functionality. It is possible to see whether the created idea will carry further and has got the needed elements to deliver the service. As examples of interdependencies 1) the purpose of cost saving leads to energy cost saving, 2) process effectiveness to optimized logistics routing, 3) REACH chemical use to HAZMAT awareness training, 4) health and safety consideration to accident rate reduction, 5) risk mitigation to insurance cost decreasing or 6) operation permits and life cycle analysis to 35% recyclable. It is possible to use coloring to show current services, services under development, future need areas and highlight trends. It is also possible to show interdependences between services.

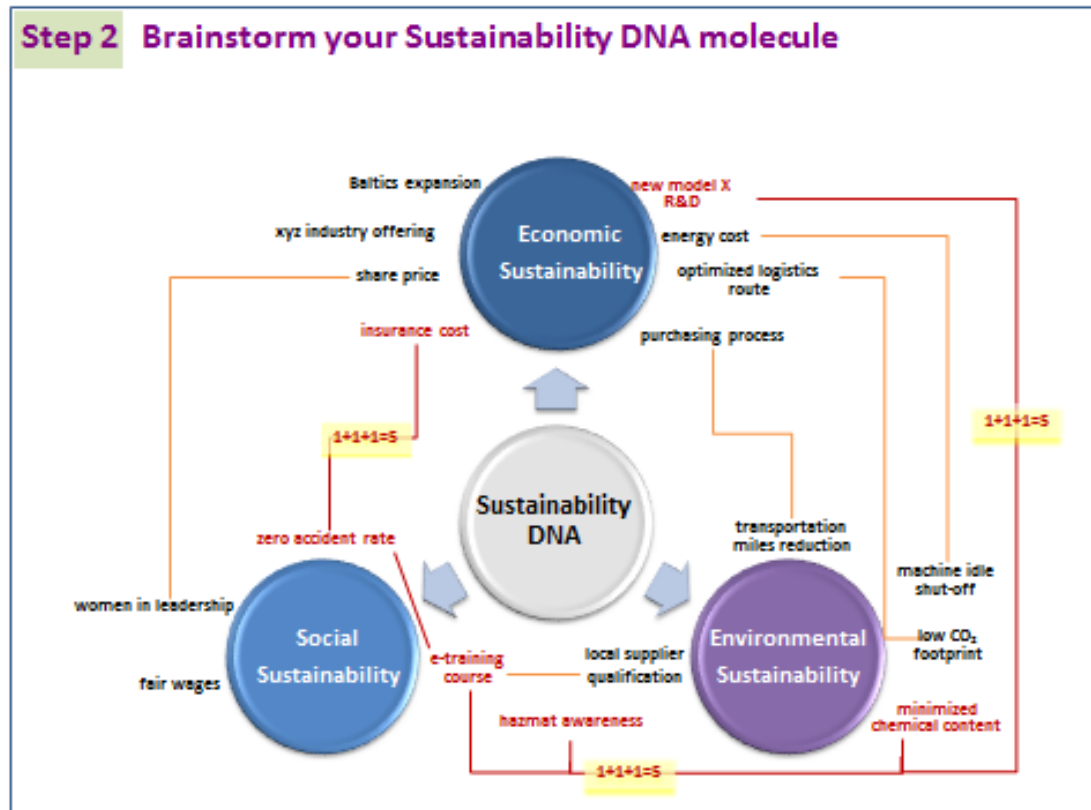


Figure 7. Sustainability DNA molecule for sustainability mapping.

The third step concentrates on highlighting the sustainability impact on service category (Figure 8). It is essential to understand your internal sustainability position on the perspectives of ROI, customer requirement or customer relationship. The position can be analyzed positive (benefits or opportunities) or negative (challenges or risks). The purpose is to take element or inspiration from step 2 and use positive or negative ratings to recognize the impact to business. The purpose is to evaluate existing service with possible opportunity. As to existing service it is essential to analyze if it has been included in marketing and sales material and whether the company has got a business structure to support the improvement of this service or to eliminate the risks.

Step 3 Highlight the Sustainability Impact of each service category

1+1+1=5

	Service	Economic	Social	Environmental
1	Pre-sales	+ Cost Savings (for Customer) + Market expansion -	+ Added value (for Customer) + Improved use (effectiveness) - Incumbent is local	+ Added value (for Customer) + Improved efficiencies
2	Customer training			
3	Equipment auditing	+ Based on predictive maintenance + Production efficiency	+ Based on predictive maintenance + Risk understanding	+ Based on predictive maintenance + Environmental efficiency
4	Service contracts	+ Based on business requirements	+ Based on social requirements	+ Based on environmental requirements
5	Process auditing	+ Based on predictive maintenance + Production efficiency	+ Based on predictive maintenance + Risk understanding	
6	Equipment recycling			

Figure 8. Sustainability Impact on each service category

During the **fourth step**, a cluster analysis is made based on materiality level of sustainability contribution on the perspective of value creation to the customer (Figure 9).

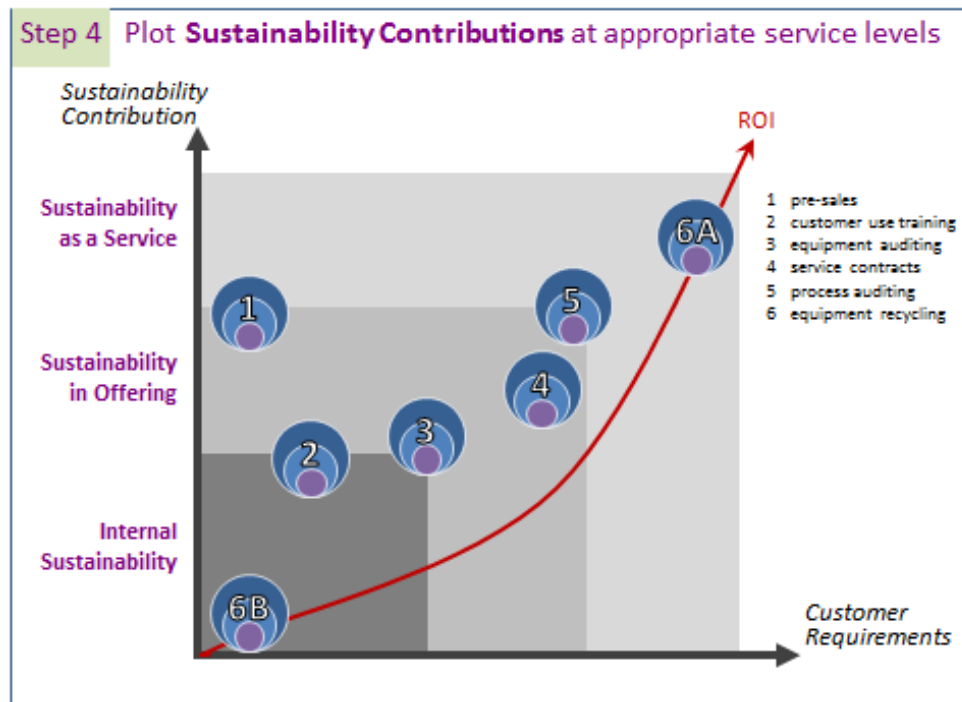


Figure 9. Materiality Analysis of Sustainability Contributions.

If we look more closely at case example 6, it shows that some of the equipment in the customer application is at the end of the life cycle and should be recycled. First an analysis is needed as to what to do with the recycled equipment to fulfill the requirements of social environment and environment laws. The new equipment should be more sustainable on the basis of production, energy and environment efficiency addressing filling business, social and new environmental requirements. Customers can use it as brand marketing argument when facing their own customers. Whole this incident chain calls for advance cluster analysis based on materiality level of sustainability and value contribution.

The fifth step starts by identifying the relevance of sustainability at each service evolution point. Figure 10 illustrates the analysis of sustainability on the perspective of economic, social and environment influence.

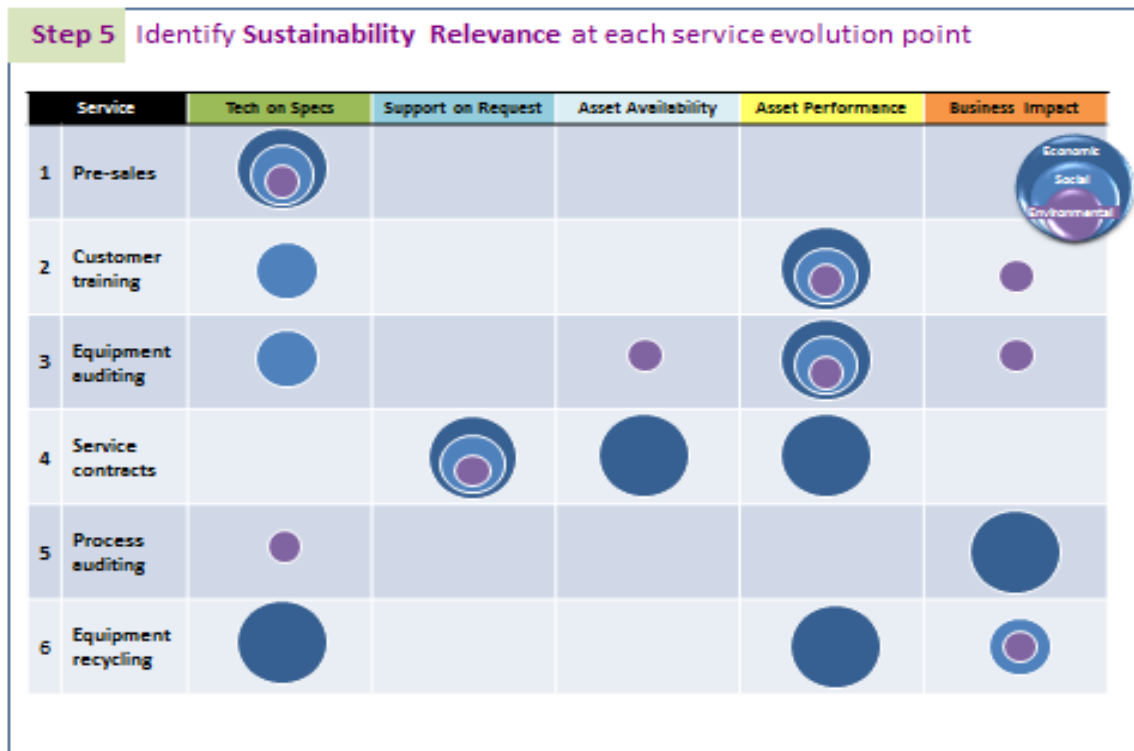


Figure 10. Company case of sustainability relevance and service value proposition by sustainability cluster element.

During this step it is essential to rise up the following questions as well as to execute the following tasks:

1. Does our service match the approach required by the customers and the market?
2. Evaluate the services according to economic, social, environmental relevance.
3. Analyze services plotting to define overall value proposition and gaps

The sixth and final step discovers and describes the sustainability driven opportunities and business growth areas. The value that leads to competitive differentiation has to be understood as well as the way how the new created service can bring ROI. The company launching the service recognizes how to capitalize on existing strengths. Step 5 creates differentiation strategy based on strengths. The opportunity is to start from DNA molecule (Step2) linkages and innovate new services based on its' analysis (Figure 11).

The sustainability positioning and opportunity matrix (Figure 11) and strategic sustainability path (Figure 2) with its development roadmaps should somehow direct "punctual" innovation over the life cycle of the customer process. Customer requirements change over the life cycle. Technology-related functional requirements change too and constantly bring new opportunities in technology implementation. The benefit, or in a more generic way the value, for the customer and all stakeholders in the value network should be better determined. That understanding helps in decision making and allows for quicker implementation.

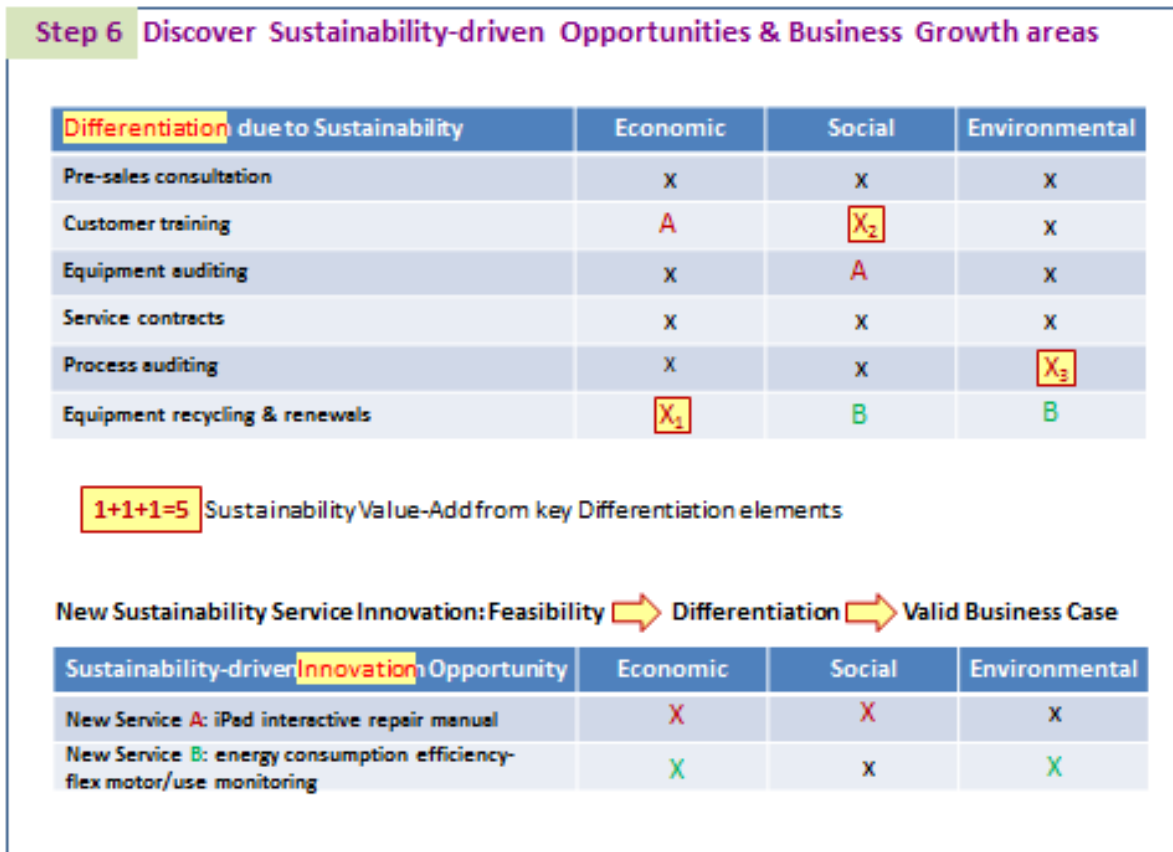


Figure 11. Sustainability Positioning and Opportunity Matrix: Innovation Opportunity

7 Life Cycle Business Transition

Manufacturing companies entering into service business undergo a stepwise transition process from equipment-based to more customer-oriented. Methods and structures supporting the business need to be adapted to a new situation. A company, willing to run profitable business in industrial context, needs to master its business transition at three levels: 1) the strategic level and strategic insights, 2) structural level and 3) operational level. Three levels of management are illustrated in Figure 12. When amount of product and services are increasing, the offering management and the relation between the products and services become more complex. In order to reduce complexity the main focus is to define business structures that are able to handle the products and services. The structural elements are covering product and service life cycle management and support the continuous change of the life cycle business.

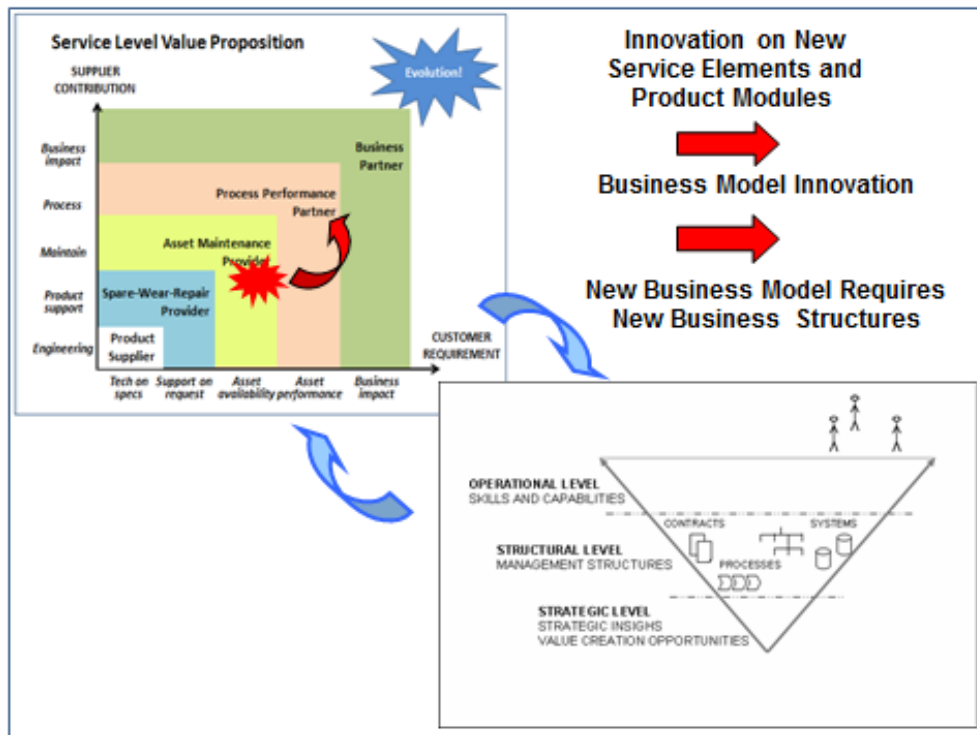


Figure 12. Service and Product Development System Enabling Business Transition.

8 Generic Business Model Structures Routing Life Cycle Innovation and Business Transition

Business transition needs some traceability and generic structures to manage continuous change. The main functionalities in business transition are

- Managing continuous value creation and proposition at customer process
- Value creation process in service business
- Management of customership and earning logic
- Making and managing of business change foresight and forecast
- Management of strategic change
- Management of business structures during change
- Service innovation, modelling and productization
- Managing operative processes and measuring
- Mastering metadata of information
- Managing semantic infrastructure and information systems supporting service business
- Mastering international business and working in networks

Business transition needs a generic business model structure (Figure 13) to route the development activities during the change. The interrelation between the elements has to be managed during fluent business transition. Business strategy is adaptive and needs continuous aligning during coevolution. It is important to understand the whole business structure to create value promise with good emotion in delivery. The promise, however, is not enough; it should also follow by proposition of the value and good emotion produced by business structures is even more important. Special attention should be placed on the most difficult changing item is organizational culture.

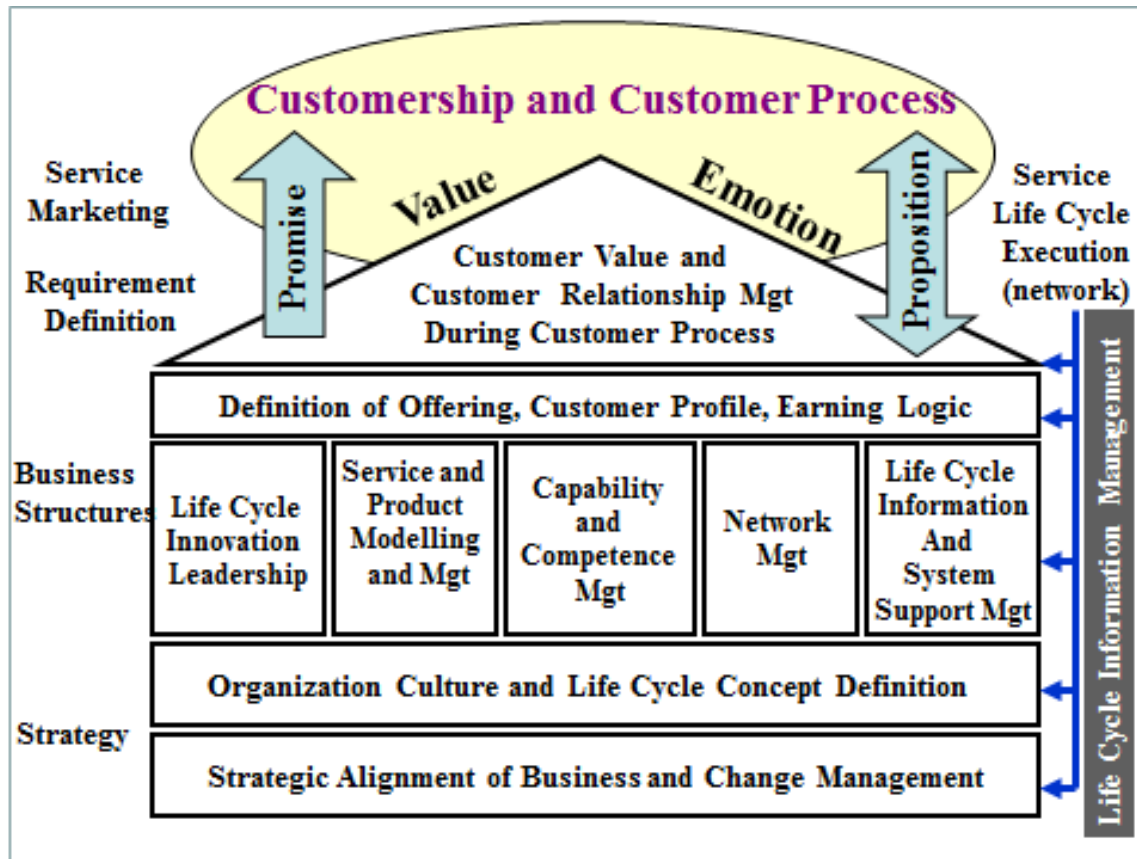


Figure 13. Generic business system model to support the dynamic transition.

9 Practical implications

The case study companies and value network companies have gained competitive advantage by implementing the created knowledge and sustainability service model via implementation processes in their business environment. It is also a great opportunity for other enterprises and partners in value networks to benefit from the created model in their own business environment to reach sustainable life cycle product and service innovation.

All the participants recognized that when the daily business is growing, and becoming more network oriented, then sustainability in service business is becoming a crucial business driver. All the partners in the value network are dependent on each other's sustainability because the sustainability of the joint offering of the value network is vulnerably dependent on the weakest link in the network. It is also very difficult to offer sustainable products and services to a customer, which is not mature enough to understand the benefits and impacts of sustainability on their business and the business of their customers respectively.

The scope of this research has been very interesting but as well too broad, therefore making the research rather complicated. Narrowing the focus of the research too much in the beginning would have made it difficult to build up a Sustainability Services Model for continuous analysis and innovation in life cycle business co-evolution routing. This work has concentrated on constructing a model based on several sub-systematics. As it would have been difficult to validate the full model in one go, parts of the model and new systematics iteratively developed have been validated in turn. For this reason, first the vision of the full system and then the ideas of the sub-systems were developed according to the constructive research and concept mapping. Sub-systems have been validated independently by various case study companies and value networks with the help of grounded theory. University experts have used the created knowledge and sustainable model in their own following research activities.

Sustainability means embedding a commitment to values while driving bottom-line business value. The first trifacta (People, Profit and Planet) is generally referred to as 'The 3Ps of Sustainability.' These elements establish the internal corporate principles which ensure organizational change is conducted in an ethical and integrated manner while minimizing risks. They set the foundation for what the company is today and what it aspires to be tomorrow. The second action oriented trifacta illustrates the proactive stance a company adopts to be able to respond to both the challenges and the opportunities sustainability considerations create. It means establishing a continuous improvement infrastructure which ensures that the company strategies are reflected in business processes, and that multidimensional profit is derived from improved performance.

Sustainability ties business functions more closely to solving the global agenda of challenges – social, environmental and economical – and simultaneously capturing market wide opportunities. The web, and

especially emerging cloud services, provides the platforms where the actions of individuals and companies can have an impact far beyond your market or industry. In this new age of the 'linked economy,' mobile phones and other smart technologies, sustainability can be used to ensure you are integrated with all your stakeholders anytime and anywhere. Sustainability is creating significant impact and opportunities where business, technology and innovation intersect.

The business positioning and opportunity analysis and strategic development path with its development roadmaps should somehow direct "punctual" innovation over the life cycle of the customer process. Customer requirements change over the life cycle. Technology-related functional requirements change too and constantly bring new opportunities in technology implementation. The benefit, or in a more generic way the value, for the customer and all stakeholders in the value network should be better determined. That understanding helps in decision making and allows for quicker implementation.

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Outcomes of reflective practice in services

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This research examines the outcomes of reflective practices in services. The literature on the strategies to foster reflective practices is still early in development and there is a lack of studies addressing the outcomes of reflective practices. The paper contributes to the current understanding of the relationship between reflective practice and outcomes by presenting a description of the internal (i.e. what kind of reflection is required to attain desired outcomes) and external factors (i.e. under what kind of circumstances reflection results desired outcomes) of reflective practices. The results are based on a case study where both quantitative and qualitative methods of data collection are utilised.

1 Introduction

Innovation has been suggested to be one of the most important issues that drive organisational performance. What it comes to services, the traditional forms of developing innovation do not fulfill the needs of rapidly changing environment. New ways of developing organisational innovation are thus needed. Reflective practices, where individuals learn from their own professional experiences, may be the most important source of professional development and improvement (Nakamura; Yorks, 2011), and also innovation and other outcomes. Earlier literature has reported some positive effects of reflective practices (e.g. Page; Meerabeau, 2000). There are some examples in the current literature suggesting that team reflection is driver of both team innovation (Somech, 2006) and product innovation (Lee, 2008). According to Somech (2006), the process of team reflection serves as a vehicle through which the interaction of participative leadership style and functional heterogeneity enhances team innovation. There are also many similar factors behind reflective practice and innovation development. These include for example individual skills and capabilities, collective culture and structural aspects. Clouder (2000) has argued that if reflective practice stops at the individual it will be limited in scope and will serve only to maintain the status quo rather than promoting change. Thus, reflective practice can also be realised also in group and organisational levels (Hildén; Tikkamäki, 2013). The literature on the strategies to foster reflective practices is still early in development and there is a lack of studies addressing the outcomes of reflective practices (Mann et al., 2009) namely organisational level innovation and outcomes.

When focusing on the previous research, it is clear that in-depth empirical studies are needed to achieve a deeper understanding of the mechanisms and arrangements that connect reflective practice and outcomes. The studies that discuss the interphase of reflective practices and outcomes have mainly been theoretical considerations or surveys that lack an in-depth understanding of how the different methods operate in a real life context. This research aims to address this research gap by examining the outcomes of reflective practices in services. This paper argues that reflective practices are a way of boosting outcomes in services. To reach the aim, the paper contains a description of the internal (i.e. what kind of reflection is required to attain desired outcomes) and external factors (i.e. under what kind of circumstances reflection results desired outcomes) of reflective practices.

2 Literature review

2.1 Reflective practice in services

Continuous professional development should not be just attending courses and gaining qualifications, but integration of learning and work, and learning from wider experiences, both on and off the job. Nowadays, developing organisations through utilising human resources should be seen as a combination of structured and unstructured learning and performance-based activities which develop individual and organisational capacity to cope with and successfully manage change. (Simmonds; Pedersen, 2006) In this paper, reflective practice is seen a way to improve the meta skills that can be learned only through experience.

The field of learning from experience illuminates the importance of reflection (Nakamura; Yorks, 2011). It has been suggested that reflection can be an important tool of developing human resources when individuals learn from their own and each other's professional experiences, rather than from formal training. Boud defines reflection as "a generic term for those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to a new understanding and appreciation". (in Mann et al., 2009) Reflection involves thinking about past or ongoing events, situations or actions so as to make sense of them, potentially with a view to informing future choices, decisions or actions (Reynolds, 2011). Reflection thus fulfills several functions, including helping to make sense of complex situations and enabling learning from earlier experience (Mann et al., 2009).

When discussing reflection in organisational development, the term reflective practice has been widely used. According to Schön (1983) reflective practice is "the capacity to reflect on action so as to engage in a process of

continuous learning". Hildén and Tikkamäki (2013) consider reflective practice as the actual ways in which reflection is manifested through individual and collective action within the organisational realm. Reflective practices are tied to learning processes as people interact and effectively share ideas and opinions as well as when they discuss possible solutions (Høyrup, 2004). The ability to reflect seems to be amenable to development over time and with practice and in the presence of group work. Discussing challenging situations or problems with supervisors, mentors, colleagues and other with greater experience seems to be important for reflection. (Mann et al., 2009; Nakamura; Yorks, 2011) Actually, support for planning and reflective practice is essential. This can come true through freedom and possibility to reflect, to make plans, to keep meetings and to get feedback on actions and plans. (Høyrup, 2004)

According to Hildén and Tikkamäki (2013) there is a need to explicitly connect the processes at the levels of individual, group and organisation to holistically understand the reflection process. All three organisational levels are simultaneously present and must be acknowledged in any reflective practice.

2.2 Consequences of reflective practice

Reflection enhances learner awareness of their abilities and promotes independent learning. When learners reflect on their own performances, it promotes metacognitive awareness of performance and the processes behind it, and this awareness is held to be necessary for autonomous learning (c.f., Chen, 2008; Little, 2007). Reflection may also be a useful tool to empower people to initiate change without having that change imposed on them (Page; Meerabeau, 2000).

It has been widely acknowledged that, in its best, reflection can generate variety of outcomes, i.e. job satisfaction (Page; Meerabeau, 2000) and innovation (Somech, 2006; Lee, 2008). There are some examples in the current literature suggesting that team reflection is driver of both team innovation (Somech, 2006) and product innovation (Lee, 2008). According to Somech (2006), the process of team reflection serves as a vehicle through which the interaction of participative leadership style and functional heterogeneity enhances team innovation. Also reflective project leadership, meaning questioning one's own leader behaviour, can be a way for project leader to promote innovativeness (Ollila, 2000).

One criticism of reflective practice is its association with the production of individual knowledge (Clouder, 2000). When investigating consequences of reflective practice, previous research has concentrated on the consequences of individual or group reflection. Organisational level reflection and its consequences have not received attention. In this research, a more holistic view of reflective practice is adopted. Reflective practice can be realised at the levels of individual, group and organisation. Also Ukko et al. (2014) have stated that when reflective practices become more explicit and are targeted through different organisational levels, they will also better foster organisational outcomes.

3 Research methodology

This research utilises case study approach. The organisation that is the subject of this case study is located in southern Finland and operates in service sector. The case organisation consists of two units with a total of 70 workers. The case study was conducted in the organisation during years 2012-2014. The store was established in 2007, and has therefore had the potential for the development of reflective practice. The organisations compares very favorably to its competitors in terms of financial measures. An action oriented development project was conducted after which the outcomes of reflective practice were studied.

Both quantitative and qualitative methods of data collection are utilised in the study. First, a survey was conducted to trace the relationship between reflective practice and outcomes. Second, interviews were conducted to clarify how the mechanisms between reflective practice and outcomes operate.

3.1 Quantitative methods

The survey included 15 items to measure reflective practice (adopted from Hildén; Tikkamäki, 2013). The survey of reflective practice is presented in Table 1. Likert-type scale ranging from strongly disagree to strongly agree was adopted. A neutral response "neither disagree nor agree", was adopted to reduce uninformed responses.

Table 1. The survey for reflective practice.

Level of reflective practice	Items	Description	Alpha value
Reflective practice on individual level	5	Within intuiting and interpreting processes	0,779
Reflective practice on group level	5	Within interpreting and integrating processes	0,747
Reflective practice on organisational level	5	Within integrating and institutionalising processes	0,867

The survey included also 2 items to measure job satisfaction and 2 items to measure service performance (to reflect people-related outcomes of reflective practice). The items of job satisfaction were adopted from Valentine et al. (2011) and the items of service performance were adopted from Chuang and Liao (2010). For each of the 4 items of outcomes, the respondents were asked to indicate their opinion on a scale ranging from 1 (weak) to 4 (excellent). The surveys were sent to all employees of the organisation. This process resulted in a total of 49 responses, and the final response rate accounted for 70 per cent.

3.2 Qualitative methods

In the second part of the study, two group interviews were conducted in the case organisation. To achieve an overall view of the outcomes of reflective practice, representatives of all levels of organisation were interviewed. The interviewees included two top managers and four sales managers of different units and departments. The interviews focused on the same three levels of reflective practice that were utilised in the survey tool. The themes of the interviews included for example the following three issues. First, the prerequisites the reflective practices in work. Second, the factors related to reflective practices that have led to a good financial performance. Third, the mechanisms between reflective practices and outcomes. The questions of the interviews were decided in advance, but the discussions were informal and were facilitated using supporting questions and comments made by the researchers.

4 Results

4.1 What kind of reflection is required to attain desired outcomes

Table 2 presents the intercorrelations of the variables used in this study. It was found that all three levels of reflective practice had significant and positive correlations with job satisfaction. Correlations were not significant with the levels of reflective practice and service performance.

Table 2. Intercorrelations of the variables.

	Individual	Group	Organisation
Job satisfaction	,391**	,486***	,646***
Service performance	-,203	-,077	,131

Sign. *** ≤ 0.001 , ** $0.001 < p \leq 0.01$

Based on analyses presented in Table 3, all three levels of reflective practice are significantly and positively connected to job satisfaction. The regression model studying the relationship between reflective practice on individual level and job satisfaction, is significant ($F = 4.854$). The adjusted R^2 is 0.106, meaning that 10.6 per cent of the variance in the dependent variable (job satisfaction) can be explained by individual level reflective practice. Also the regression model of the connection between reflective practice on group level and job satisfaction is significant ($F = 10.134$). 19.1 per cent of the variance in job satisfaction can be explained by group level reflective practice. The model of reflective practice on organisational level is also significant ($F = 32.214$), explaining 44.6 per cent of the variance of job satisfaction. Thus, the results indicate that reflective practice in all three levels tends to be positively related to job satisfaction, which is consistent with the predictions. On the other hand, the models investigating the connection between the three levels of reflective practice and service performance were not significant. It can be concluded from the regression results that all three levels of reflective practice are connected to people related outcomes. However, this applies only job satisfaction, but not service performance.

Table 3. Regression analysis results of the variables.

Independent variable	Reflective practice in		Different levels			
	Individual	Group	Organisation	Individual	Group	Organisation
	Beta	Beta	Beta	Beta	Beta	Beta
Dependent variable						
Job satisfaction	,325*	,437**	,668***			
Service performance				-,177	-,049	,221
F	4,854*	10,134**	32,214***	1,360	,108	2,362
R	,325	,437	,668	,177	,049	,221
R ²	,106	,191	,446	,031	,002	,049

Sign. *** ≤ 0.001 , ** $0.001 < p \leq 0.01$, * $0.01 < p \leq 0.05$

4.2 Under what kind of circumstances reflection results desired outcomes

Based on the interviews the main prerequisites for the reflection are the right capabilities and resources for working. This means the understanding of a job description, having the appropriate skills for a job, as well as the organisational support, up to date tools and enough time for the tasks. This enables the proper focus, time and energy for the reflection and development in an individual level. This encourages breaking the organisational boundaries and discussing about the critical issues enabling at the same time changing the old routines. Further, it is essential to understand that these prerequisites need to be acknowledged also in group and organisational levels associated to the consultative culture and rewarding.

Also the results of the interviews strengthened the notion that reflective practice in an organisational level is crucial for attaining outcomes. Multiple issues were disclosed to foster a connection between reflective practices and the desired outcomes.

- The development subjects/themes that the reflective practices are intended to effect need to be limited to a few key themes and the connection to the performance is needed to be justified and discussed.
- A variety of reflective practices can be utilised to facilitate the selected themes.
- The reflection needs to be target-oriented at individual, group and organisational levels.
- Different organisational levels need their own measures and targets for the selected themes that the reflective practices are believed to have an effect.
- The measures and targets of different organisational levels need to be in line with each other.
- Work satisfaction, work motivation and commitment are important features for the reflective actions.
- The performance management systems have to be considered as a communication and social system to enable reflectiveness and both the individual and organisational learning.

In the case organisation there are a number of organisational level measures that need to be achieved. However, the common perception of the interviewees was that there can be only a couple of themes that the reflective practices can be linked. This means that the utilisation of reflective practices needs to be controlled to a certain point and sent the clear message for the employees what the contemporary development targets are. Otherwise there are too many issues that the employees need to focus, which may lead to unfinished development actions. The managers thus need to filter the right development targets and justify their connection to performance. In a case organisation the key development targets were outlined to be the following: 1) multi-skills (technical & product), 2) active sales approach and willingness to serve, 3) coaching skills, and 4) system skills. These development targets were aimed at result superior customer experience of the service. These development targets were measured in all three levels of reflective practice; individual, group and organisational levels. The connection of these targets to the financial performance was highlighted in all possible situations that allow reflection:

- The managers took a contact to all the employees in every day
 - Managing individuals

- The managers had conversations with all the employees (presence, meeting)
 - Increasing the meaning of work by the interest of managers
- The managers gave problems to solve for the employees (effectiveness)
 - Activating employees
- Regular small group meetings
 - Increasing the openness and facilitating the transmission of tacit knowledge

In all situations above, the development targets and/or measurement information were discussed and highlighted both formally and informally. Those situations were also perceived as good places for the reflection and learning, and considered as reflective practices.

As an example of reflective practices, the interviews resulted factors beyond the good financial performance in a case organisation. In comparison to other stores, the studied units made their own targets and decisions in addition to the efficiency targets that were launched by the chain control. These decisions were made together with the employees by allowing them to ideate the actions towards the desired targets. This allowed the possible to avoid the redundancies and reorganise to tasks, which was perceived as better work atmosphere and a motivational aspect that strengthened the commitment of the employees. This in turn promoted the thinking that the work is something that needs to be developed, which realised as an excellent service, a service culture and positive service experiences (customer satisfaction feedback). The sense about being as excellent sellers was strengthened through the reflective practices.

4.3 Summary

The following Table 4 provides a summary of the results of the quantitative and qualitative parts of the research.

Table 4. Summary of the results.

<i>Outcomes of reflective practice</i>		
	what kind	under what kind of circumstances
Reflective practice on individual level	+	Clear job description Appropriate skills for a job Organisational support Up to date tools Enough time for the tasks
Reflective practice on group level	++	Regular small group meetings Organisational support Up to date tools Enough time for the tasks
Reflective practice on organisational level	+++	Target-oriented Clear and limited key themes Connection to performance justified and discussed Assisted by performance measurement (Facilitating reflective practice as a communication and social system)

5 Conclusions

The paper contains a description of the internal (i.e. what kind of reflection is required to attain desired outcomes) and external factors (i.e. under what kind of circumstances reflection results desired outcomes) of reflective practices. The research contributes to the current research by clarifying the connection between reflective practice and outcomes. According to the results, reflective practices are connected to outcomes. When reflective practices become more explicit and are targeted through different organisational levels, they will better foster outcomes. The role of performance management and measurement is important in connecting the reflective practices with performance. There is a need to have measures in all organisational levels that enable comparison and reflection of the results, and showing the direction of the development at the same time. However, performance management must be consider as a communication and social system that allows the employees to discuss about learning and development process as a part of the results. As a practical contribution, the results of the research may help professionals begin to understand that leveraging reflective practices may aid an organisation in achieving its desired outcomes.

The results of this paper are based on case study in one company, which limits the generalisability of the findings. Thus, it is required to assess its robustness and validate its adequacy. Although the results supported many of the

propositions in prior literature, they also generated a number of open questions for further research. First, it is not clear whether, and to what extent, reflective practice affects financial outcomes (e.g., profitability). This should also be a subject of future studies. Second, it is worth examining more detailed in what types of impacts does it result when utilising reflective practice in other sectors. Third, it seems that the consequences of reflective practice are dependent on many factors, and it is thus important to study how reflective practice should be organised in different business areas and with different types of reflective processes.

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Personal health systems technologies: Critical issues in service and system innovations

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Personal health system (PHS) technologies can enhance public and private health service delivery and provide new business opportunities in Europe and globally. Although plenty of PHS technology has already been developed and is potentially available to technically provide virtually everyone with an access to actively participate in personalized health care, research undertakings driven primarily by a technology push may fail as they do not situate PHS within the wider health and social care service systems they have to form a part of.

This paper captures various aspects of the scattered PHS research and innovation landscape and markets: We deployed several kinds of analyses (bibliometry, patents, SNA, stakeholder workshops and interviews). Our analyses aim at the identification of critical issues in the development and implementation of service systems around PHS technologies.

Introduction

Health care systems face the well-known challenges like rising costs, ageing population, increasing demand and shortage of health care professionals. Personal Health Systems (PHS) assist in the provision of continuous, quality controlled and personalised health services to empowered individuals. PHS provide a horizontal development area across a variety of patient groups, clinical specialties, technology fields and health services. Hence, the development of PHS requires and can mobilize the emergence of novel cross-disciplinary and -sectoral innovation partnerships. Building on the earlier definitions (Codagnone 2009) we have defined the PHS for the purposes of this work to consist of:

- Ambient, wearable and/or in-body devices, which acquire, monitor and communicate physiological and other health-related data
- Intelligent processing of the acquired information (data analytics), and coupling it with expert biomedical knowledge and in some cases, knowledge of social circumstances and living conditions
- Action based on the processing of acquired information, either applied to the individuals being monitored, or to health practice more generally, concerning information provision and/or more active engagement in anything from disease and disability prevention (for example through diet and lifestyle management) to diagnosis, treatment and rehabilitation.

Former research in the area of PHS has often given little account of special patterns of innovation in the PHS sector (Cunningham, C. et al. 2005), as the knowledge and experience about how to implement research results into concrete policy and strategy development in health is still in its infancy, particularly with regard to the specific needs of the European level.

We examined the PHS research, innovation and policy areas with the ultimate goal to attain a deeper understanding of mismatches between the potential of, and need for, PHS, and current policy and innovation initiatives and framework conditions (e.g. in terms of future technological opportunities and societal demands).

The main question of this paper is why PHS technologies do not diffuse readily despite the advantages they offer to a variety of actors in the health and social care system (HSC).

The next section introduces the conceptual approach this research is based on. Section 2 provides insight into the methods of investigation we applied. Section 3 shows the results, section 4 concludes.

1 Conceptual approach: service systems

Services are often thought of as essentially person-to-person interactions, where the service “product” is coproduced in the course of a service relationship. But we have become familiar with technology-to-person services, where instead of interacting with a member of staff of a service organisation, the client interacts with technology – often through online and mobile communications, sometimes through devices based at the premises of service organisations. These are often described as customer self-services, basic considerations are relevant in the area of PHS. For instance do examples of transactional self-services indicate that typically the service is provided within a “service system”, a concept that has gained considerable attraction in the last ten years. As well as the customer/client and the devices (and software) they are using, there is the service organisation which they are reaching through these interfaces, the personnel of this

organisation – some of whom they may interact with (front-office staff) and others who provide unseen support services (back-office staff). Information flows are a universal feature of such systems, in which the organisations (often using technologies) link people ; some other transformations may be effected by specialist people or technologies too (such as surgery and other medical interventions, physical transport, and classic personal services such as hairdressing and help with daily life).

The concept of Service Systems is one that has evolved quite rapidly, with some specialist versions (often coming from the information systems community) being rather elaborate and restrictive. One well-known definition introduces the notion of POTI – Service Systems are “dynamic configurations of resources (people, technologies, organisations and shared information) that can create and deliver value to customers, providers and other stakeholders” (IfM and IBM 2008: 18). Various authors, such as Karni and Kaner (2006) stress the service element of such systems, with customers/clients being much more important parts of the “P” in this framework (as compared to many other Sociotechnical systems) - they are participants who often provide important effort, information, and the like into the service design and provision. They may well place limits upon what the (formal) service provider can do, and set standards for what should be achieved. In many cases, health and social care included, the customers/clients may not be just the recipients of care, but also other stakeholders (such as family members) who may have their own demands upon, and inputs into, the service. Maglio (2010) sees these four key building blocks of service systems as varying on two dimensions: physical versus non-physical, possessing or not possessing rights. This characterises the various four resources of Service Systems as follows: People (physical, with rights); Technologies (physical, without rights); Organisations (non-physical, with rights); and Information (non-physical, without rights).

Karni and Kaner (2006) went beyond the POTI framework, to provide a description of the elements of service systems, noting the role of consumers/clients in these. It is not hard to see how such a framework could be elaborated much further with HSC examples at the fore. People – whether consumers or service suppliers, are complex agents, with highly diverse cognitive frameworks, values and attitudes, physical and emotional needs, and so on. This means that Service Systems can be complex to model and manage – but also that they may be resilient and innovative. People can be empowered to act in non-mechanical ways, responding to unexpected circumstances and collaborating to solve problems. They can be linked together through new information technologies.

The service itself is seen by Maglio and his colleagues as essentially involving a value proposition that is shared with and delivered to the consumer. When we think about the HSC case, we can see that there are many levels of granularity we might need to consider: the immediate service provided at one moment in response to a particular event (e.g. administration of a drug); the set of interactions immediately surrounding this specific service activity (e.g. the visit of the consumer to a surgery or the visit of a HSC professional to the person’s house); the broader treatment of the consumer in question over a series of interactions (“touchpoints”) with the service organisation as the “service pathway” or “service journey” is traversed by the consumer; or the overall service to the community that is provided by a particular HSC organisation (which may be a constellation of many of the specific services discussed above). The level of granularity that is chosen for analysis is rather a practical matter.

1.1 System innovation and transitions

Rotmans (2006) has described system innovations as “organization-transcending innovations that drastically alter the relationship between the companies, organizations and individuals involved in the system”. Such an ambitious type of innovation is required to address many of society’s grand challenges, including those associated with active independent living and the introduction of PHS. It is often related to the need for “transition management”, an approach that enables breaking out of various locked-in heritages and organisational routines; there are costs as well as benefits in such changes, and there are liable to be protracted learning processes and negotiations undertaken.

This sort of perspective is introduced to account for what are often seen as the barriers and obstacles to progress, often encountered when technically effective innovations are introduced into social systems (Schot and Geels 2008). The transitions approach argues for the need to take the interests and perspectives of numerous stakeholders into account (for example, hospital management may not benefit from the reduction of in-patient stays associated with the use of PHS – but hospitals are still an important part of the HSC chain). The approach suggests particular types of experimentation and development of strategic niche markets; of determining “boundary objects” through which stakeholders can gain their own appreciation of the innovation; and to develop transition pathways through which the new service system can be constructed.

The shift to PHS may be understood as a system transition in the sorts of terms established in transition management accounts, and which draw on ideas from the approaches developed in Social Construction of Technology and similar approaches to innovation studies²²⁴.

²²⁴ Broch (2011) provides an example of multilevel analysis of innovation around care services for the elderly.

2 Methodology

Figure 1 gives an overview of the different types of analysis that were applied in our research project. Our first approach was to get a comprehensive overview of the various kinds of PHS projects through web-based research. Apart from the purely technical research projects, PHS projects exist on different levels of aggregation and analysis:

- **Meta level PHS projects:** These are mainly research projects which have made considerable efforts in defining and demarcating the PHS area. They are academic projects which follow an analytical approach in their occupation with the field. They are mostly publicly financed and well documented.
- **Meso level PHS projects:** These projects combine an analytical approach with a strong focus towards application. Typically the project partners involved are from research and consulting organizations, also academic organisations on the one side, and on the other side are based on various case studies distributed over Europe where actors from private, public and third sectors are involved in implementing local personal health systems. These projects are well documented, especially on the single case level.
- **Micro level PHS projects:** These are national/regional local bottom-up projects, primarily focused on application. They are PHS cases according to the definition applied in this paper. Project partners develop out of their eco-systems and receive financing at some points in time. Typically projects and follow-ups develop over at least one decade, it is often difficult to demarcate the start and end of these undertakings. These projects exist in a wide variety on the national and local levels. They are not well documented, in most cases there does not even exist a project website.

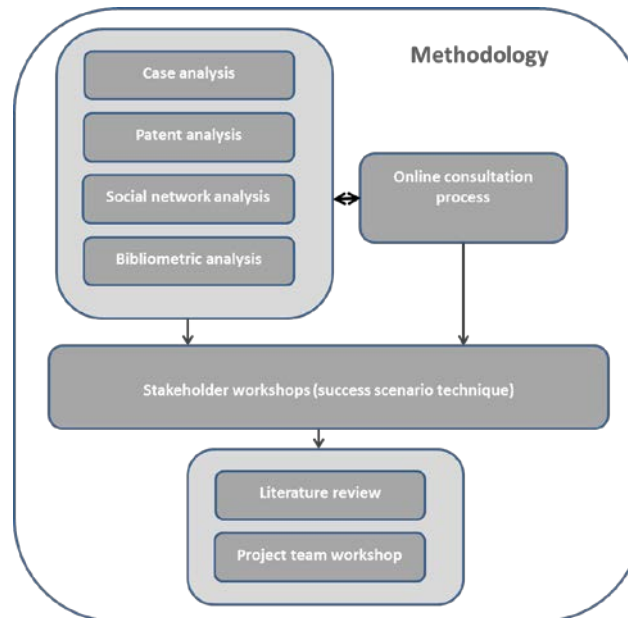


Figure 1. Methodologies applied in the course of the project.

Source: By the authors

At the start of our research we conducted several small analyses in order to get a first overview of the PHS area:

- A **bibliometric analysis** aimed to provide an understanding of present state and future trends on the PHS topic.
- An additional small study was conducted to analyse the **patents** in the field of PHS. Patent information was obtained from “Derwent Innovation Index” and “Patent Citation Index”.
- Tools and concepts of **Social network analysis (SNA)** were used in this study to visualize R&D collaboration networks and central actors in the area of PHS on the European level. A SNA perspective focuses not on the individual social actors, but on the broader interaction contexts within which the actors are embedded.

Furthermore, throughout the project, the project website has been deployed to establish an online platform for launching a structured and systematic **online consultation process** with multiple phases to generate and cluster visions on breakthrough innovations and societal demands.

Two stakeholder workshops were organized in order to explore the pathways for desirable future developments. The method applied was the success scenario technique, which is supported by background research, and organised in a detailed set of procedures. We took a Scenario to be a systematic vision of future possibilities. “Systematic” implied that the scenario had a good measure of internal consistency; and also that it covered developments in a fairly holistic way, it was not just an assembly of a few quantifiable parameters. “Future possibilities” covered two elements of scenarios, with specific studies often emphasising one or the other: Future Histories (outlining events or trend developments so as to describe an evolving, unfolding future), and Images of the Future (focused more on describing

the future state of affairs at a point in future time). "Vision" implies that we were articulating our account of the future into a coherent narrative, rather than just presenting lists of disconnected bullet points. Scenario workshops typically bring together a range of knowledgeable and experienced participants, usually stakeholders of one kind or another, within a structured framework of activities. They represent opportunities for structured strategic conversation. This means careful design. The scenarios should also possess greater legitimacy than those produced by a smaller expert group or visionary guru, at least if the workshop has drawn upon a reasonable range of participants.

Results from all previous analyses, the online consultation process and the stakeholder workshops were then again **cross-checked with existing literature** and discussed and rounded up in a **project team workshop**.

3 Results

The various strands of analysis resulted in a number of critical issues (for an overview and basic definitions see Figure 2) and related governance deficits, which can be the basis for possible policy designs to overcome the variety of thresholds in the adoption and diffusion processes of PHS technologies and the services around them.

3.1 Social acceptance

The general trend towards individualization in healthcare works in favour of a more widespread use of personal health service systems. Highly standardized mass-production of healthcare services may satisfy needs only in a limited number of cases, instead healthcare services have to be heterogeneous and personalised in order to reflect individual needs.

Stakeholders in interviews and discussions during the PHS project as well as the literature on PHS assume that the growing technology affinity works as a driver for PHS diffusion. The global dissemination of sophisticated technologies and mobile phones and consequently the use of these devices (internet applications, smart phones and application (app) development) is a strong trend, and this trend is reinforced as increasingly the senior part of the population will be familiar with advanced ICT as they will have used it already in their professional and private lives (The Capital Region of Denmark and Health Care Innovation Centre 2011: 6).

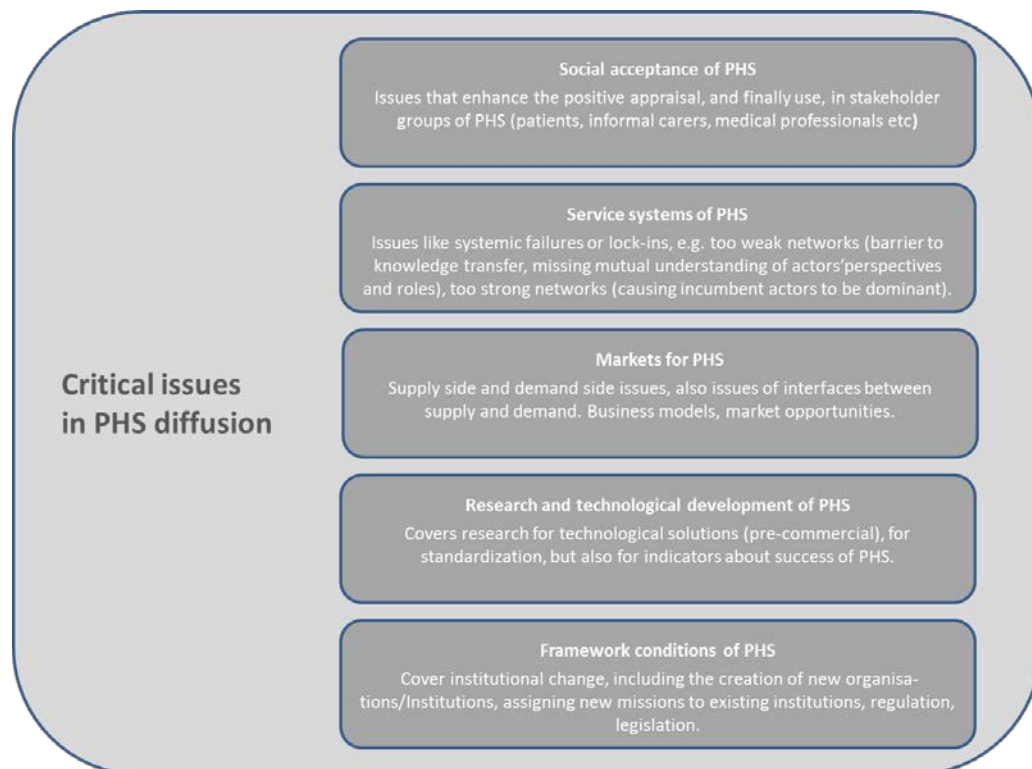


Figure 2. Critical issues in PHS diffusion.

Source: By the authors

At the same time technology skepticism acts as a barrier: Elderly individuals show uncertainties as to new technologies, e.g. they frequently commented that they are unable to use touchscreens. There is lack of trust in technical devices, as such can fail, either due to an operating error or due to a technical defect. Social acceptance of the technology includes also acceptance on behalf of professionals. Innovation-mindedness on a lower management level and a positive attitude of care professionals can be of vital importance for eHealth innovations. If there is a general fear of operating errors or hard to control alarms, this will slow down adoption rates of PH service systems (Gkaitatzi, Bekiaris et al. 2010; van der Plas and van Lieshout 2012). These attitudes depend on several factors, including: levels of digital literacy in society;

alleviation of public and professional concerns about confidentiality of health-related data; approaches to pricing of and payment for PHS use; and strategies concerning the "imposition" of PHS and/or changes in or even the withdrawal of the traditional services they may replace.

Implementation of PHS may entail that actors in health care have to leave their predefined and expected roles, which is always likely to cause resistance. Social insurance funds have a culture of financing health services once the damage is done -providing health care services to prevent further damages is increasingly the role that is expected from them, but has not always been. Physicians may be reluctant to engage in further services and training in order to empower patients and treat them as equals, as experts themselves, which may prevent the implementation and use of personal health system. A further obstacle is the primary mono-disease orientation of medical professionals. On the other hand, patients are often expected to show more commitment, participation and self-management, abandoning the traditional doctor-patient hierarchy.

A point of general concern in the workshops organized during the PHS foresight project was the issue of equity and equality of access to PHS. While it may be possible to seek to apply the equal distribution principle applied in hospitals - i.e. that all people should receive equal attention and treatment - this is less applicable when healthcare is "brought out into society". Inevitably there will be more advantaged social groups (RADs) who may be able to afford more sophisticated services than the less advantaged (REDs). Alongside this issue, which has a strong political component, there is also the possibility of PHS directly contributing to social inclusion, for example by reaching out to remote geographical locations that may have been less well served by centrally managed public health systems (Amanatidou, Miles et al. 2014).

Social acceptance of PHS is of course crucial for the widespread implementation and use of PHS. According to our discussions and analyses during the PHS Foresight workshops and interviews, social acceptance is hinged to several factors: Digital literacy of the population as a whole is vital, as well as concerns about confidentiality, and also the pricing of and payment for PHS use. What is often neglected in discussions about social acceptance is the fear of potential users concerning the "imposition" of PHS, which means that the introduction of new services relating to PHS technologies may cause a withdrawal of traditional services (too early) or the use of PHS technologies may be used as a condition in order to be able to receive other types of services (e.g. insurance), and in the extreme to punishing non-adopters.

Governance issues relating to social acceptance of PHS

- Equality of access: It is important not to increase social inequalities through enabling PHS services only for the more advantaged. This encourages also public financing of certain PHS services.
- Implementation of PHS in new services may naturally involve new roles for practitioners and patients, who may not always accept these easily. This may need matrons (on part of the nurses)/champions (on part of the patients) to advertise new roles.
- An increase of digital literacy is necessary for social acceptance, e.g. education programmes for professionals. This helps overcoming technology scepticism of medical professionals and management. Social acceptance of PHS also depends on digital literacy.
- More broadly, increasing health literacy of population is likely to support social acceptance of PHS, e.g. education about healthier life-style management.

3.2 A systems perspective: Ecosystems of PHS

A wider systems approach takes into account the need to design complex architectures relating together people (recipients of care, care-givers, and others), organisational structures and processes (that determine divisions of labour and responsibilities, flow of resources, etc.) and technologies (especially the information technologies, but also other health and social care-related devices and software).

One notion that has increasingly attracted attention in this context is the notion of **ecosystems**. Ecosystems consist of different stakeholders, each with its own goals, perspectives and challenges. Stakeholders on the one hand are part of the science and technology system, like firms, technology developers, the scientific community, and are on the other hand part of the health care delivery system, with actors public and private, practitioners and patients, as well as patients' organisations and relatives. All of these are heavily influenced by regulators, and the institutional framework in general.

In order to introduce innovative ideas in health care successfully, it is often vital to take account of the ecosystem. Especially integrated service solutions often depend on aligning various actors in the ecosystem, and are hinged to the **health care reimbursement and financing models**, regardless of the differences in EU countries' institutional set-ups of public health care. Basically, there are two models of reimbursement in public health care: fee for service (DRG based reimbursement, typical for hospitals), and fee per capita (number of patients treated, regardless of measures taken, typical for general practitioners). Both models for reimbursement applied in public health care seem to run against the implementation of personal health systems and integrated service solutions. Keeping patients out of hospital – through successful implementation of PHS – reduces the fee for services which hospitals receive, and hence their incentives to adopt PHS. On the contrary, general practitioners who receive fees per capita may be unwilling to accept extra (and maybe unpaid) work which is associated with the additional PHS services (Abadie, Codagnone et al. 2011).

These funding silos in residential and hospital care pose substantial difficulties to the introduction of PHS services, which often aim at linking the two or avoiding one for the other.

This puts the focus on introducing additional fees (for PHS services) or other types of remuneration and financing. But it also highlights some of the problems that a transition between service systems can involve – the **challenge of system innovation**. This typically requires more than just excellent technological solutions, but also a multi-stakeholder process of service system design. Another major barrier is the rigid division between health care practices and home care practices. This is typical for many countries and has severe consequences for the widespread introduction and adoption of PHS.

Governance issues relating to the systems perspective and PHS ecosystems

- Organisational and system innovations in public health care are not likely to come on their own, they would have to be a (political) priority. A combination of all different sources of finance and adaptation of current models of remuneration means a system innovation in many European countries.
- Public financing of PHS: Public reimbursement is often hinged to system innovations. Funding silos result in disincentives to invest: Investors cannot enjoy advantages of investment because resulting cost savings often appear in a different budget. Overcoming of funding silos will be necessary to also enable PPPs in funding and providing PHS health care services.

3.3 Markets for PHS

3.3.1 Markets for PHS: Data

Reliable data on the markets for personal health systems seem **hardly available**. There is a variety of market reports by market research companies and consultancy firms that share a common optimistic view on the markets, or particular market segments²²⁵, of PHS (e.g. Frost and Sullivan (Frost&Sullivan 2010) Arthur D. Little (Taga K. et al. 2011), Datamonitor (Datamonitor 2007), Deloitte (Ludwig 2009), and InMedica (Khandelwal 2010), cited from Baum and Abadie (2013: 15; 27; 44). However, these market **reports by market research companies tend to use a technology-driven market segmentation**, and often are methodologically unclear as to what units are actually counted in sales figures. Some of the reports note that ehealthcare investment has generally been proxied by ICT investment rather than healthcare investment (Baum and Abadie 2013: 8; 13). In general it may be noted that the perception of PHS markets by these market reports is skewed by a supply-side view.

3.3.2 Markets for PHS: characteristics of supply

There is an inherent difficulty in surveying the supply-side of the PHS market, as it is likely that **supply is also characterised by individuals or very small companies**. The smart phone approach has lowered significantly the market entrance barriers for new producers who can now rely on an existing smart phone and and programme an app at nearly marginal price (Baum and Abadie 2013: 36). E.g. the mHealth supply is dominated by individuals or small companies, with 30% of mobile app developer companies being individuals and 34.3% being small companies (defined as having 2–9 employees) (IDC, cited in European Commission 2014: 7).

The above has to be considered when looking at existing surveys of the PHS supply side: The SIMPHS project surveyed of 115 companies, which supply PHS technologies and solutions and are active in Europe (but may originate elsewhere). Of these 115 PHS companies, almost three quarters (73 per cent) are large and medium-sized firms and around two thirds (66 per cent) are more than 5 years in business (Baum and Abadie 2013: 61). This points to the difficulties of identifying small-scale operations (e.g. individual programmers) and young firms which can be assumed to also populate the supply-side of the PHS markets, especially in the mHealth and fitness realms.

Still, **in terms of markets shares** it seems likely that the markets are **dominated by large incumbent champions** (Baum and Abadie 2013: 26). Purchasing decisions of public health care as customers may be powerful factors of success. However, if the customers are public health care providers, innovation and adoption cycles are extremely long (5–10 years). Firms need certain characteristics to endure such long phases of adoption which mostly incorporate extended processes of adaption to customer needs. Furthermore, public health care providers as customers need reliable partners over years or decades, which make them more likely to ally with incumbent supply firms that have been successful for a long time already.

²²⁵ Market segments are the remote patient monitoring and treatment (RMT) market, the Telecare market, Telehealth market, mHealth market

Governance issues relating to market supply

Long adoption and innovation cycles in (public) health care have to be accounted for. Left to self-organising mechanisms, this favours large firms and publicly financed organisations and disadvantages SMEs, due to length of the process.

3.4 Markets for PHS: characteristics of demand

Considering all available material and qualitative research carried out in the present research project we assume that that the optimistic market prospects by market research and consultancy firms may fail to take into account the demand side, and in general, a wider systems view, which seems particularly complex considering health technologies like PHS. The wider systems approach we adopted in the PHS project led to the following considerations concerning the demand for PHS:

Who expresses demand? It seems to be a characteristic of demand in PHS markets that clients are on the one hand users and may on the other hand be patients, in which case the client may be a different kind of person/organisation. This depends of course on the type of PHS service solution, and accordingly, the literature on PHS markets is torn between the focus on users (ICT focus) and on patients (health focus). One of the main questions that come up is if demand for PHS will rise substantially on the basis of out-of-pocket money from users/patients or on the basis of private insurances who acquire additional services for their clients. Or if instead there will have to be clear financing and/or spending decisions on the part of public health care bodies. However, there seems to be only anecdotal evidence of PHS market players negotiating agreements with public health care bodies, and these were the results of longstanding, resource-consuming individual efforts (Abadie, Codagnone et al. 2011: 57).

One issue impacting on demand in the PHS area is lack of trust in individual applications. If there is a high number of applications existing, which one should the user/patient as an individual trust. And is it then necessarily the same that his physician trusts? This bears a danger of disoriented markets and consequently leads to the following question: **How then, does a general need for change and efficacy in health care translate into demand for single PHS products and services?** It may have been too readily assumed that the advantages the introduction of PHS solutions can have in terms of efficient and personalized care, rather directly initiate new service systems which channel demand for single PHS solutions.

One reason why this may not be the case is that it often involves a systemic innovation which needs a multi-stakeholder process and takes time (see above). Another reason may be that demand for PHS solutions follows patterns that we have learnt from the scarce research on age-based innovations, see for example Levsen and Herstatt (2014). Demand for age-based innovations shows distinct features depending on the obviousness of the *age-specialisation of the product or service* (Levsen and Herstatt 2014: 19ff). If products or services show a moderate to high age specialization, they face great challenges: **First**, moderate to high age specialization of products and services means they offer substantial benefits in sustaining or restoring individual autonomy, and as a consequence potential users are largely limited to those who have already experienced a markedly age-associated decline in individual autonomy. The main challenge here is that **users are hard to reach** due to their significantly reduced mobility or cognitive abilities. The search for information and processes of choice, which are cornerstones of purchasing decisions, are limited. Distribution via regular consumer channels may be significantly restricted, which results in costly and difficult sales processes. **Second**, if users do not suffer from advanced autonomy decline, products with moderate to high age specialization bear the **risk of stigmatization, or of being non-prestigious at the least**. **Third**, if others, like informal carers, take over the purchasing decision, these products and services bear the **risk of non-acceptance by the targeted users**.

On the other hand, if goods are similar to non-age-based products and services in appearance and functionality, i.e. designed to be used independently of age, this has two direct consequences: First, benefits in enhancing the potential users' autonomy are likely to be less. Therefore, these products and services target clients that still have a relatively high level of autonomy. Second, existing advertising and sales channels may be used, which offers ample possibilities for private business and corporate for-profit innovators.

Moreover, Levsen and Herstatt (2014: 21) point out that when innovative products and services with moderate to high age specialization and the associated challenges in demand also involve substantial and costly R&D efforts, these are of limited attractiveness for purely profit-seeking innovators. The **financial risks here are related to both, technical development and subsequent commercialisation**. Hence, innovators are mainly organisations that are wholly or partly financed by the public (e.g. research institutes, universities, private companies that receive public funding or tax breaks). Their motivation to innovate is guided by the societal challenge of an aging population instead of the aspiration of short-term profit.

Governance issues relating to market demand

- Lack of trust hampers technology transfer - there is a risk of disorientated markets: If there are a million applications out there, which one should a patient/user trust? And is it necessary the same their doctor trusts?
- The age-specialisation of innovations poses particular challenges in expression of demand and sales processes.

3.4.1 How to gain value? PHS and business models

Throughout all contacts and investigations during our project relating us to stakeholders in the PHS area, there has been a constant claim for new business models in the PHS area - the logic behind being that valuable market opportunities for PHS solutions pass because of ill-defined value propositions. This poses the important question of why new business models in the PHS area do not develop readily. **What prevents profit-seeking individuals/ organisations from defining new value propositions and exploiting technological opportunities if they seem obvious?**

Looking at the (small strand of) research on business models in health technologies we found that the **definition of value propositions may indeed be a fraught with difficulties**: Apart from the pharmaceutical industry where there are productive alliances with biotech spin-offs, there is little research on how business models and health technology evolve and interact with each other, one of the few exceptions being Lehoux, Daudelin et al. (2014). According to them, business model innovation is no smooth process and may take time as a number of interacting factors are relevant: The development of a business model results from a “sequential adaptation to new information and possibilities” and articulates an innovation’s value proposition and its market segment, the value chain, the revenue model, the value network and the competitive strategy (Chesbrough and Rosenbloom 2002: cited in Lehoux et al. 2014). It starts with a selection of one value proposition latent in the new technology, out of different latent value propositions in the same technology. The definition of the market segment to which the (health) technology will offer value also has important consequences. Patients and their relatives, physicians, nurses, health care managers, governments, employers and third-party payers are all concerned by the value of a health technology. There is an uneven distribution of benefits among them resulting from the new technology, and they may be unevenly willing to pay for these benefits. Managing the value chain for creating and distributing the value selected and offered involves tradeoffs and may interfere with the different interests by stakeholders (Lehoux, Daudelin et al. 2014: 1028). Hence, the development of a business models faces significant uncertainties regarding an innovation and its market, the uncertainty being even higher if it is a newly founded firm out of non-business spheres (private, academic). Uncertainty may seem less in a newly founded firm out of industrial sphere, but here it is often heavily influenced by the industry’s dominant logic (Sabatier, Craig-Kennard et al. 2012).

Owing to these uncertainties, fleshing out a business model often results in processes of synergistic readjustments or even drastic reconfigurations of the original business model (Lehoux, Daudelin et al. 2014).

PHS technologies and services are associated with **positive externalities**. Positive externalities are benefits which accrue to others than those who pay the price. In case of PHS, informal carers, patients, relatives, health professionals, hospital managers, social insurance, tax payers, employers – they all may benefit from the introduction of a PHS technology. Depending on the business model, however, they may not all be priced. In economic theory, this is one type of market failure, which justifies government action. If left to private producers, the product or service in focus is supplied too little. On the whole, this may contribute to markets in PHS not boosting. Private firms expect investment by public actors, who apart from financial restrictions also would have to engage in a process of system innovation in order to implement PHS service systems efficiently. Instead, public health care providers/ public actors expect investment by private firms. These mutual expectations may result in hesitant investment, or underinvestment on both parts.

Governance issues relating to business models

- More research efforts in business model innovation for health technologies will be necessary. New business models do not seem to develop readily. Slow diffusion is often attributed to lack of business models.
- Hesitant markets: Positive externalities of PHS products and services may result in sluggish investment, or even underinvestment.

3.4.2 New market opportunities

From the above theoretical issues and empirical evidence that we have from the various PHS Foresight investigations we derived four types of stylized markets, which are distinct in their characteristics of supply and demand, and are hence distinct in their particular drivers and barriers (see Table 1).

Table 1. Stylized markets in PHS.

Health status / age Financing	User / younger age	Patient / older age
Public	Public PHS services for prevention <ul style="list-style-type: none"> Most likely for users with risk factors In widespread diseases (public health) Requires health literacy on part of patients Requires widespread change in public health care systems which now mainly dedicate funding to therapeutic and palliative care, only minor amounts to preventive care Extremely long innovation cycles (adoption 5–10 years) 	Public PHS services for therapeutic use <ul style="list-style-type: none"> For the unhealthy, elderly, disabled, mentally declined Most likely in widespread diseases, (public health) Demand mediated by public actors, may be difficult in acceptance and require organizational/system innovation Long-term development and adaptation of technology Large firm involvement more likely because of long innovation cycles and resulting financial burdens by firms Extremely long innovation cycles (adoption 5–10 years)
Private	Life-style PHS products/services <ul style="list-style-type: none"> young, dynamic, stylish, cheap, web-based apps; demand difficult to foresee, may be viral in adoption and in dropout Very short innovation cycles supply by SMEs, or even individuals 	PHS products/services for home care <ul style="list-style-type: none"> Addressing the unhealthy, elderly, disabled, mentally declined Relevant users hard to reach through conventional advertising and communication channels Maybe demand through informal carers, also depends on acceptance by patients Costly and difficult sales processes Non-prestigious products Limited attractiveness for purely profit-seeking innovators

Source: By the authors.

On the basis of these stylized markets we derived **new market opportunities** from the various workshops, discussions and interviews during this research project, which may lead to additional market opportunities in PHS.

- ✓ Rooms for manouvre may be provided by the third sector, charities, NGOs, and private health insurances. They all may generate considerable demand apart from public health care providers and private customers/patients. These may also be services for specialized groups provided by the Third sector.
- ✓ Housing and real estate developers are potential customers as they equip their compounds increasingly with telecare systems and services which are complemented by safety and security services (see also Baum and Abadie 2013: 30).
- ✓ mHealth services can be part of corporate social responsibility (CSR) activities of companies. Firms purchase PHS solutions /services for their employees. CSR initiatives may also promote healthy lifestyles.
- ✓ Conventional and standardized, publicly funded PHS services for REDs; sophisticated, highly personalized services for RADs (e.g. financed through private insurances);
- ✓ Crucial for the self-organisation processes in complex systems is the spread of information about successful applications, but also about failures. The dissemination of good practice and modes of PHS applications through an easy-to access information portal was estimated leverage diffusion.
- ✓ On a more general level, public and public-private measures (in collaboration e.g. with food industry, sports clubs, etc.) are important to promote healthy lifestyles and wellness, as well as general measures to increase health literacy in the population.

Governance issues relating to new market opportunities

- Self-organisation in PHS realm is hampered due to insufficient information about successful applications. Disseminating good practice is vital, e.g. through a data base of PHS projects, containing evaluation. Coordination of PHS activities is important, also a follow-up of pilots.
- Knowledge sharing about applications and successful and unsuccessful PH service systems is seen as crucial. Successful projects as well as failed projects should be available in the data base, in order to enhance learning processes.
- Evidence base for PHS is seen as crucial: How did implementation of PHS technologies improve health outcomes? Reliable data on this are crucial for empirical evidence base and decisions based upon this.

3.5 PHS research, technology development and innovation (RTI)

3.5.1 Technologies and standards

Today, plenty of technology is potentially available that can be utilized to overarch the “last mile”. But healthcare processes are complex since they potentially comprise of many system players in different organisations. One way of dealing with interfaces and complexity is promoting interoperability, i.e. the capability of systems to exchange data in a plug-and-play like fashion. Interoperability is generally thought to have at least three distinct levels, i.e.:

- Syntactic interoperability (e.g. Bluetooth, USB, ...)
- Semantic interoperability (IEEE X73, HL7 CDA, ...)
- Pragmatic interoperability.

Most standards widely in use today are concerned primarily with the syntactic layer, i.e. they deal with data communication protocols and message composition. Standards for the semantic layer, which are concerned with the “meaning” of the data, are much harder to use and less mature today. Such standards are essential though when it comes to making systems to understand each other, for example if one would like to apply decision support on a multi-modal data basis, taking into account information from clinical documents and data provided by patients directly via PHS.

To achieve pragmatic interoperability, finally, means to be able to orchestrate (the ICT infrastructures of) different healthcare providers into a continuous caring process, spanning the borders of healthcare organisations or even whole healthcare systems in case of cross-border healthcare.

It turns out that standards are often not enough to achieve higher levels of interoperability. This requires initiatives that guide the utilisation of standards in the context of well-defined use cases. Major interoperability initiatives in the field of healthcare are the “Integrating the Healthcare Enterprise” (IHE), and the “Continua Health Alliance” (CHA) initiatives. IHE is an initiative by healthcare professionals and industry to improve the way IT systems in healthcare share information. IHE promotes the coordinated use of established standards to address specific clinical need in support of optimal patient care. CHA’s mission is to “establish an ecosystem of interoperable personal connected health systems that empower individuals and organizations to better manage their health and wellness.” (Carroll, R. et al. 2007). Both organisations do not create standards themselves but promote clearly defined use cases in which existing standards are deployed.

Whereas IHE is primarily healthcare system focused and becomes relevant mostly in the last step while sending healthcare related data to EHR systems, CHA is taking care of systems and devices close to the patient. CHA’s mission is broader and includes not only telehealth in terms of remote monitoring of vital signs but includes systems more dedicated to wellness and fitness as well as to support elderly people in terms of independent living (Ambient Assisted Living) and also those being cared for at home (telecare). As such, CHA is of prime importance to the PHS domain. IHE, however, is also essential in cases where PHS systems are to be linked to healthcare professionals and are not confined just to the patients themselves, informal care or consumer oriented systems (“gadgets”).

As organisations promoting standards, it is of vital importance that these alliances be open and provide access to various types of firms and organisations in partnership, otherwise there could be a danger of limiting market entry. Market entry barriers are a major concern for competition policy.

During the PHS Foresight workshops certification and standardization of hardware, software, devices and systems were estimated as the main role of public policy to ensure quality of services and allow interoperability.

3.2.5 PHS indicators of success

Research on PHS is not only necessary for technologies and standards, but also to analyse the benefits of PHS applications. This is the basis for comparing PHS applications and also for communicating success. The empirical investigation of efficacy and effectiveness of PHS implementation in turn is the basis for the wider diffusion of these technologies and development of new services around these technological solutions. However, it needs further research on criteria for success and indicators, also in order to compare either different service solutions or before-and-after situations.

Questions guiding this kind of research are likely to be:

- What are criteria for the successful implementation of PHS in new services?
- How did PHS solutions impact on health and wellbeing in society?
- Who benefits and how can this be measured best?

Governance issues relating to RTI

- Further technological research concerning features of the technologies, interoperability, userfriendliness, reliability, robustness etc seems necessary.
- There are standards existing, however there is still an issue of interoperability at the semantics level
- Standardization is seen as a main role of public policy. Open clubs are necessary in standard setting and interoperability issues, otherwise competition may be hampered.
- Research on indicators for benefits of PHS

3.6 Framework conditions

During the PHS workshops and interviews it was often stated that healthcare services will no longer be provided only by traditional caregivers like nurses or physicians. Many other qualifications have entered this sector changing also the social stratification. Policy makers are challenged to assess these developments and take the right decisions in order to maintain a critical workforce of service providers on the one hand and guarantee high quality healthcare for every member of our society on the other hand (see also MovingLife (2012)). With new technologies we will need technically skilled experts able to implement, run, and maintain the systems and at the same time train the users (patients, nurses, doctors, relatives, etc.) for daily usage of such systems. At the same token many care givers who originally are not affiliated with modern technologies are facing new challenges when needing to adapt to their daily usage. Different patients might need different technologies. In every home there might be another technological device to help the patient and in many cases it is actually the care giver and not the patient who is using the technical device. All players in the health sector will need to think how these additional skills can be achieved by the care givers and according to what mode they will need to be reimbursed.

How health care organizations deal with their accumulated digital information (big data) is crucial for the uptake of health ICTs. Sharing sensitive patient data in a large heterogeneous environment complemented by the use of web-based applications raises a number of privacy and security concerns. Case study evidence by OECD (2010) suggests that appropriate privacy protections must be integrated in the design of new health ICT systems from the beginning as these proved to be difficult to be introduced ex-post (OECD 2010: 66f).

According to EHTEL (2008: 6) the implementation of incident reporting procedures would also be welcome – similar to those employed by the pharmaceutical industry. Associated with such incident reporting should be the control that all eHealth information systems have been properly implemented and audit trails managed, which should be the subject of constant monitoring for incorrect operation or abuse. This is a standard for medical products on the basis of the Medical Device Directive (MDD), however apparently there are gaps with respect to service packages based on PHS technologies (Apps as medical products?).

Governance issues relating to framework conditions

- Legislation in different European countries has to be harmonized. This also concerns admission processes of PHS as medical products.
- Legal: Regulatory framing: Who is liable in case of malpractice?
- Ethical: Issues of privacy and data security of data are vital; certification, quality assurance. Apart from being ethical issues and provisions have to be integrated in the institutional framework, issues of privacy and data security also have consequences for social acceptance: Social acceptance also depends on concerns about confidentiality.
- Education and certification of emerging skills is important, e.g. concerning big data.

4 Discussion and conclusion

The concept of PHS is often collapsed into the specific information systems that are constructed to support new HSC services; or even into the specific devices that are employed within these information systems, such as wearable sensors to monitor health conditions and/or behaviour patterns. In this paper we argued that this fails to take into account the importance of a wider systems view, one which situates PHS within HSC service systems. Such a wider approach takes into account the need to design complex architectures relating together people (recipients of care, care-givers, and others), organisational structures and processes (that determine divisions of labour and responsibilities, flow of resources, etc.) and technologies (especially the information technologies, but also other HSC-related devices and

software). But it also highlights some of the problems that a transition between service systems can involve – the challenge of system innovation. This typically requires more than just excellent technological solutions, but also a multi-stakeholder process of service system design.

There is a widespread view that PHS can contribute to improved health outcomes as well as increasing the efficiency of health services. In principle these should be very substantial contributions, though early demonstrator studies are somewhat equivocal in displaying major gains (in particular, cost-savings). This reflects the fact that we are dealing with "wicked problems" involving numerous stakeholders, numerous specialised types of expertise, and indeed a multiplicity of specific problems aggregated together under the healthcare rubric. "Wicked problems" evolve, and PHS are emerging at a time when complex restructuring of health systems - and even of the notion of health itself - is being prompted by demographic, technological and social changes. PHS will be part of this restructuring, and the extent to which the potential gains of PHS are achieved will be affected by the form it takes. Substantial challenges are involved in shaping this restructuring so that it can rapidly capitalise on the potential of PHS, while supporting equity, patient empowerment and moves to more healthy lifestyles.

Numerous stakeholders will be involved in this process, which involves building what participants described as "a PHS Innovation eco-system". It will be important to recognise the very real interests of different stakeholders - for avoiding deterioration in health outcomes, for maintaining and extending the equity and social inclusion elements of health systems, for stimulating the development of innovative and effective health interventions and medical technologies, for maintaining professional competences and social status, for rewarding entrepreneurial behaviour, for protecting and for using personal data. At present the emergence and potential of PHS has not been widely debated beyond expert communities, and much wider processes of consultation, dialogue and vision-creation will be required to ensure that interests can be articulated and - where necessary - challenged in a transparent manner.

Meeting these challenges will require experimentation, dialogue, and monitoring of change. This study indicated some of the major aspects of change that will need to be addressed. They range from the creation of new business models and partnerships between organisations of different kind, through stimulating the acquisition of new skills and the emergence of new professions in health (and related) workforces, to putting regulatory frameworks into place that can allow for informed acceptance of evidence-based solutions. In all of these aspects of change, public attitudes will need to be taken into account, since citizens are crucial stakeholders in these processes. This will need to be the focus of much greater effort in the near future.

The present study is, hopefully, one step in the direction of adopting a holistic and combined approach in understanding PHS and establishing and sharing visions of the desirable futures that can be achieved with the use of PHS, and the problems that may be encountered and the ways in which these may be addressed, in the course of shaping these desirable futures.

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Software and Services in the Music Industry: A Proposition of a Data Description Standard

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This paper presents the results of the research project ART-e-FAKT²²⁶ that investigates the problems and shortcomings of today's music business. Forced into massive changes by the triumphal procession of the internet, business models, accompanying supporting software systems and standardised process models to deal with these changes are lacking. Therefore, we were investigating the most pestering problems and developed a solution from a technical point of view.

1 Introduction

The highly fragmented music industry is characterized by a multitude of small and independent actors operating on an increasingly competitive market. One important challenge is the variety of international distribution (streaming, downloads, physical etc.) and marketing channels (print, online, TV). This results in an increasingly complex market with a strong emphasis on the dissemination and intelligent use of data, for both, describing music and billing purposes. Software solutions supporting these tasks holistically are not available yet. Instead, either non-standardized software or no software at all is used. This results in the lack of interoperability due to heterogeneous data formats, discontinuity of media, inconsistencies between data of different actors and redundant work steps. Due to limited financial resources and diverging requirements of the multitude of actors, advancements like standardized data formats or consistent software support have not been achieved yet.

This paper proposes an ontology as an intermediate schema for business data of the music industry as a possible solution for these challenges. To determine the domain-specific requirements as foundation for an appropriate solution, the first step consisted of various workshops, interviews and a market analysis (Chapter 0). On that basis, the specifics of services in the creative industry are deduced (Chapter 0). The music business ontology (MBO) as the main result of these findings is presented in chapter 0. To show exemplarily the usefulness and applicability of the ontology, various use cases with corresponding tools are introduced in chapter 0.

2 Methodological approach

In order to develop a well-grounded understanding of the music industry, its players, its processes, its technologies in use and derived from that the potential need for services, we approached our field of study in an explorative manner. We conducted a qualitative research approach to ensure openness and objectivity towards our research environment. The entire study is presented in Gey et al. (2014). In the realm of this paper at hand, we focus on the relevant facts for the development of a better understanding towards service and technologies.

We conducted eight qualitative expert interviews from October 2013 to June 2014 based on the suggestions of Liebold and Trinczek (2009). We used a semi-structured questionnaire as a guideline. Our interviewees were employees and owners of labels and publishers, mostly small and medium sized companies (SMEs). Moreover, we could speak to representatives of collecting societies and the organization of independent music organizations (VUT – Verband unabhängiger Tonträgerunternehmen) in Germany. The interviews covered questions about their daily work processes, about their communication patterns, and about their network of clients and suppliers. Further, a loose collection of issues our interviewees are struggling with in their daily work was compiled. The interview questions were closed by topics about software tools and potential services the interviewees felt they were in need of. The material was transcribed using the Open Source transcription software *easytranscript*²²⁷. After interview transcription, we organized two workshops with the interviewees in order to discuss our first results. The workshops were split into a label specific and a publisher specific one. During the workshops, we could further analyse processes and established services in the music industry as well as the tools the actors in the industry are using. Interview transcriptions and the analyses of the workshop were then analysed with a content analysis approach (Krippendorff, 2004) and by using the qualitative data analysis software *Atlas.ti*²²⁸.

Our data analysis showed several results. As mentioned earlier, the complete list of results can be consulted in our study on the music industry (Gey et al., 2014). At this point, we focus on results relevant to the subject service and technology. Our analysis showed, first, labels and publishers nowadays have to deal with a growing amount of possible business models and revenue channels – distribution options of music are manifold: vinyl, tape, CD and various digital download and streaming channels. The growing diversity of distribution channels significantly increases the

²²⁶ <http://artefakt.uni-leipzig.de/start.html>

²²⁷ <http://e-werkzeug.eu/index.php/de/easytranscript>

²²⁸ <http://www.atlasti.com>

administration costs on the label or artist side. This is particularly challenging regarding the stagnating or even declining revenues on the label side. The major challenges for a successful endeavour in the music industry are the efficient handling of the distribution channels or to make purposeful decisions in favour of specific channels. Further, we estimate the aggregated market share of various digital distribution channels continues to increase in the future. Consequently, marketing expenses and efforts increase as well. Online marketing and social media complement and outpace conventional marketing channels. The rising administrative workload of labels and publishers is attended by a multitude of economically smaller distribution channels. This calls for approaches towards service-oriented technologies in order to facilitate the administrative workload.

Moreover, problems with technology were constantly reported throughout the interviews. Data redundancy, missing or error-prone standard software or interface incompatibilities were topics our interviewees are continuously confronted with. Several times, they articulated the need for holistic software covering more than only one specific aspect of the music business, for instance, a customized enterprise resource planning application for the music industry. In the moment, labels and publishers manually control, edit and transfer data from one system to another which signifies a high time consumption. Differing formats and manual data transfer result in a missing reuse of data and consequently increase the administrative burden of the actors in the music industry.

A continuously differentiating market, a lack of technological solutions and missing data standards in the realm of the music industry led us to several conclusions. First, data schemas have to be developed. Second, software tools based on these schemas to support the operational tasks of musicians, labels and publishers must be engineered. Third, based on the tools new services can emerge around these new software tools.

3 Service specifics of music industry

Several aspects that influence the development and provision of services could be identified by means of the conducted interviews. First of all, it was revealed that a wide variety of different partners is involved in a typical value chain of the music business. Though only a few global players dominate the music business, about a quarter of sales are generated in smaller companies²²⁹. Since these companies cannot afford to lose income, it is of special importance for them to make their everyday business as efficient and effective as possible.

Due to the widespread type of companies involved in the music business, up to now, no agreement on standards exists. The absence of standards is an increased challenge due to the growing IT usage. Thus, a multitude of different, company-specific software tools is used. These tools usually cannot communicate with each other due to missing standardised interfaces resulting in the fact that a lot of manual and redundant labour is required.

Most of the services that are accomplished as daily business from companies in the music business are characterised by a high degree of routine work, e.g. registration of a musical work and account costing bringing a new musical work into the market. According to the classification of Verma (2000), these services can be described as *Mass Services* with the following characteristics.

First, the services have a low degree of customer contact and only offer limited support for customisation. This is due to the fact that artists usually do not have any influence on how their labels work internally. Furthermore, most artists are not interested in these facts, since they need to concentrate on creating musical works. Though activities like registering new musical works today are responsible for a great amount of work, they can be easily supported using standardised software tools. In doing so, it is possible to shift the type of these services (*Mass Services*) to *Service Factories*. Besides only limited contact and customisation influence, service factories are also characterised by a low labour intensity (Verma, 2000).

Due to the growing economic pressure and decreasing profit margins, companies of the music industry need to provide their products on different distribution channels, e.g. downloading, streaming, licensing. By using standardised software tools, it is possible to serve all these distribution channels by the means of one single access point. In the music business, special emphasis should be placed on creativity and not on bureaucracy. Thus, simple solutions are necessary especially for artists for allowing them to concentrate on creating musical pieces.

As mentioned above, standardised software applications seem to promise the greatest benefits regarding enhancing performance and simplifying everyday business. However, due to the great diversity of involved companies, it might not be possible to enforce one single application with reasonable effort. Hence, this paper presents approaches for defining an open and interoperable format for communication between different companies. In doing so, every company can use specific software systems providing functionalities the company requires.

4 The music business ontology

Based on our conclusions we were looking for a technology, that would support the specifics of the music business in the best way. Our technology of choice became the Semantic Web (Berners-Lee et al., 2001), more precisely ontologies (Chandrasekaran, 1999). An ontology models a bordered part of reality as a formal representation of knowledge and concepts. It uses a shared vocabulary maintained by the W3C to denote types, properties and interrelationships of those concepts. Every object or instance of concept is represented by an URI that uniquely identifies it. Information about this

²²⁹ www.enrasys.de/schule/material/musik.pdf

object is stored as triples. Triples are in the form of subject, predicate and object. As with natural language, the predicate relates the subject to the object and describes the kind of the relation, see Figure 1. An extensive introduction to ontologies is beyond the scope of this paper so the interested reader is referred to e.g. Chandrasekaran et al (1999), Guarino (2004) or Smith and Welty (2001).

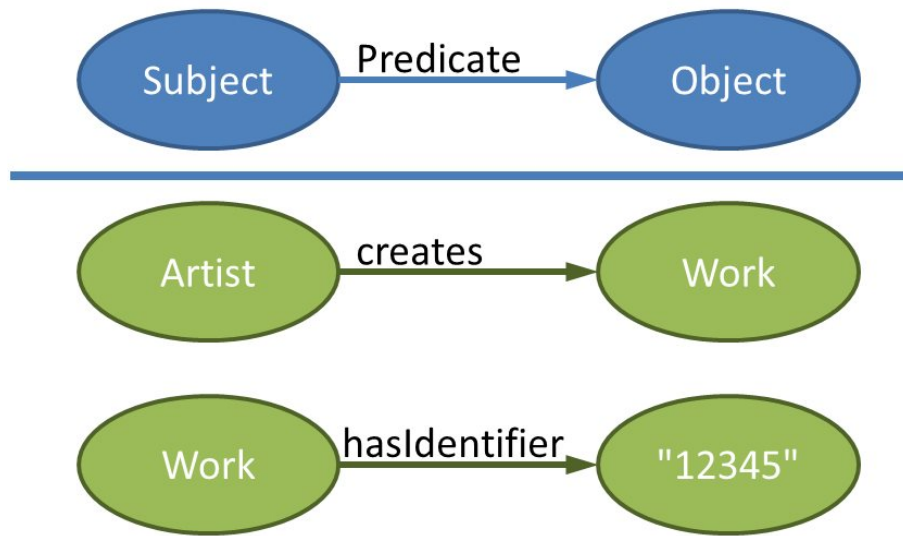


Figure 1. Triple.

An advantage of representing the data as triples is the higher flexibility of the data scheme in comparison with conventional relational databases. As a consequence, it is easy to add data not already designated by the schema and to extend the schema itself. Further, data based on different versions or extensions is still exchangeable. Another advantage is the possibility to link the data with existing data from peripheral contexts, like geographical information. Moreover, the use of ontologies is usually residing in an Open Source Community context, which will alleviate the propagation as an open format.

We started the development of the Music Business Ontology (MBO), which models the field from the perspective of companies from the music business. We researched existing formats dealing with music objects like the Music Ontology (Raimond 2008), or the community driven portal musicbrainz.org²³⁰, that collects data about music. Its structure to represent the data was incorporated in the development of the MBO. Further, we had a look at existing proprietary formats from the music business like Phononet²³¹, DDEX²³² and Gracenote²³³.

The main difference of the MBO to other formats from outside the music business that deal with musical objects is that the MBO focusses on those objects as products that can somehow be traded with, where the other formats focus on depicting information mainly about the music itself. This information is important to the MBO as well, but is arranged around the business objects. To these business objects, we relate information about their use in business transactions. For example, you can store information about the authors and their share of a work and the royalty statements of distributors and copyright societies.

As one specific goal, we want to propagate the MBO as an intermediate format. Approaches like the Global Repertoire Database have shown that the enforcement of a generally accepted data standard throughout the business is a bold task that even the bigger companies were unable to establish. With the use of the MBO as an intermediate format, there is no need to instantly restructure the whole IT-infrastructure of the entire music business. The only necessity is to develop converters that translate a given proprietary format to the MBO format and vice versa. This way, the data transport can be made more fluent and the daily business of the players in the music business is simplified. On top of that, a set of tools supporting very specific tasks can be established. As more and more software will support or be able to work with data in the MBO format and more tools are available, it will be easier to propagate the MBO as a quasi-standard. In Figure 2, we show the potential of the MBO as an intermediate format for the music business.

²³⁰ <http://musicbrainz.org/>

²³¹ <http://www.phononet.de/>

²³² <http://www.ddex.net/>

²³³ <http://www.gracenote.com/?language=de>

How the MBO can improve data transfer in the music business

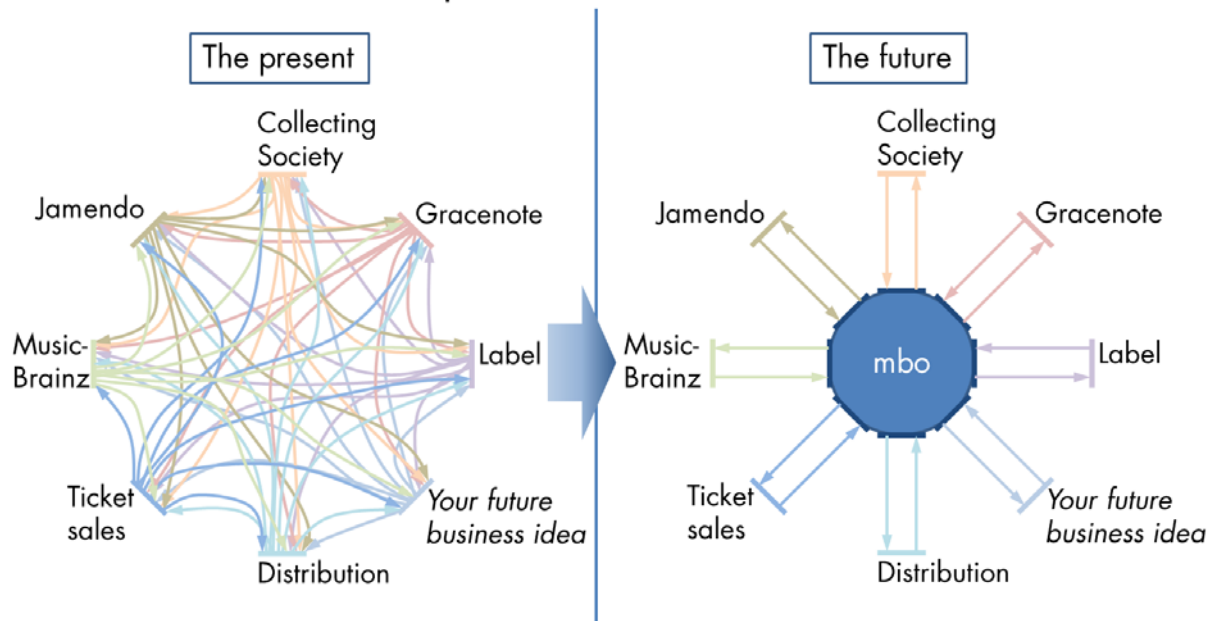


Figure 2. The MBO as intermediate format.

The first goal when developing the MBO was to represent the products which are dealt with in the music business. We identified *releases*, *recordings* and *musical works* as the main products that the music business is selling. We then created the relations between them. Then we added other crucial concepts relevant for the business processes like the performing *artist* and the *authors* of a *musical work*. This can be considered as the basis of the MBO. To this basis, we add business concepts like *royalty statement*, which describe the revenue the artists and labels get for sold products, the *creation involvement*, which describes the portion each author contributed to the creation of a musical work. Figure 3 describes the main concepts and relations between them of the MBO. As the development of the MBO continues, more business concepts like live performances or merchandise will be added in the future.

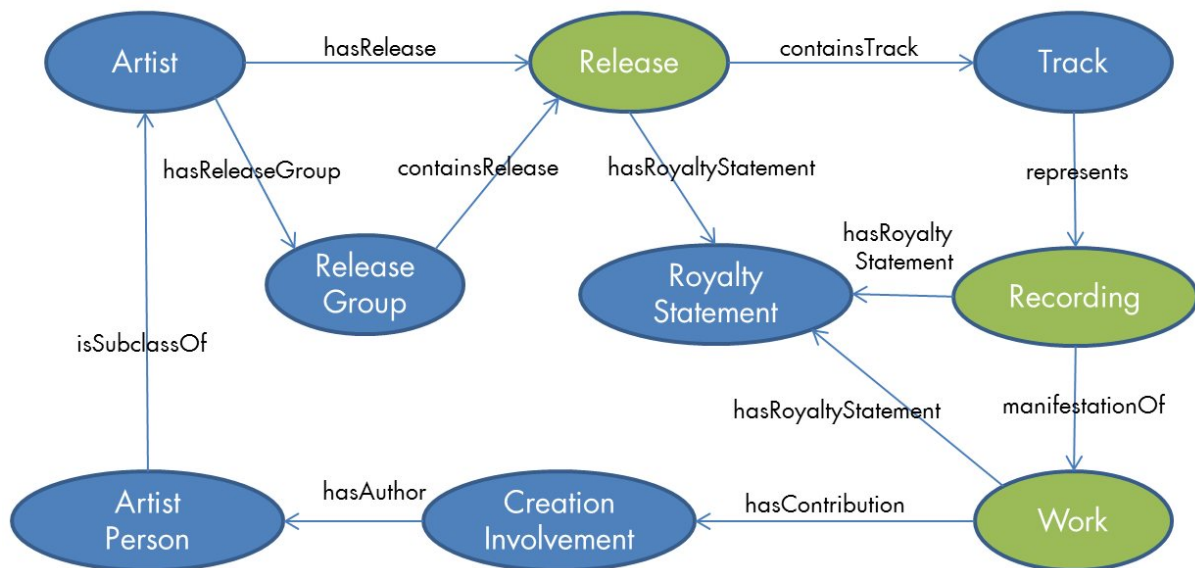


Figure 3. Main class structure of the mbo.

This structure serves as a schema for the information stored in the database. As mentioned before, the data is stored in the form of triples (subject, predicate and object) where subject and object resembles an occurrence of a concept and the predicate depicts the relation between those occurrences.

An example would be to store an artist and a release and the connection between both. The connection is that the artist created the release, which is resembled by the property *hasRelease*. At first we need to create an identifier (URI)

for the artist and add the name of the artist to the URI. For our example, we use the turtle notation²³⁴, which is commonly used when writing triples. First, the necessary namespaces are established using the following PREFIX identifiers.

PREFIX mbo: <http://creativeartefact.org/ontology/>

PREFIX res: <http://creativeartefact.org/resource/>

PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>

Using these prefixes, it is possible to define the respective artist:

res:myArtistURI a mbo:Artist.

res:myArtistURI rdfs:label "mollust"@de .

Then we create the URI for the release in an analogue way:

res:myReleaseURI a mbo:Release.

res:myReleaseURI rdfs:label "Schuld"@de .

Now we can create a relation between the two entities, thereby depicting, that the artist "mollust" has created the release "Schuld".

res:myArtistURI mbo:hasRelease res:myReleaseURI.

In this way, we can store any information about the objects, e.g. the members of a band or the tracks that are part of a release. The MBO offers a set of concepts and properties. In the future, we can add more of these, when the need arises or another, more specific ontology that is based on the MBO may be created. This way, we are very flexible regarding future changes and developments of the music business. If a new way of exploiting music is invented, the regarding concepts and properties can be simply added to the MBO.

5 Use cases

To spread the use of a schema like the MBO, it is mandatory to provide tools, that benefit from the MBO and that add a significant value to the daily work of the players of the music business. Moreover, the introduction of the new tools has to be as smooth as possible, requiring as less manual work as possible from the user side.

Nowadays, the data of the music business companies is spread over a wide range of formats, tables, stores, files etc. that can only be used by the application that stored it. The MBO enables the application to share the data amongst each other. This enables the user to reuse data already stored and avoid the need to manually re-enter this data for different applications or uses. Thereby redundancy and error-prone, multiple manual input of data is minimized.

²³⁴ <http://www.w3.org/TR/2012/WD-turtle-20120710/>

ArtistType	Group	<input checked="" type="checkbox"/>
MusicBrainzId	e818d23d-54a5-4b3b-93f6-41285c0365e6	<input checked="" type="checkbox"/>
Name	mollust	<input checked="" type="checkbox"/>
SortName	mollust	<input checked="" type="checkbox"/>
Country	DE	<input checked="" type="checkbox"/>
Area	Germany, DE	<input checked="" type="checkbox"/>
Disambiguation	Opera metal from Leipzig	<input checked="" type="checkbox"/>
ReleaseGroups	List of Release-Groups	<input checked="" type="checkbox"/>
ReleaseLists	List of Releases	<input checked="" type="checkbox"/>
Release	Schuld (Album) CD	<input checked="" type="checkbox"/>
Release	Bach Con Fuoco (EP) Digital Media	<input checked="" type="checkbox"/>
MusicBrainzId	9c67a971-f179-4496-b73e-0f430f82c518	<input checked="" type="checkbox"/>
Title	Bach Con Fuoco	<input checked="" type="checkbox"/>
Status	Official	<input checked="" type="checkbox"/>
Quality	normal	<input checked="" type="checkbox"/>
Packaging	None	<input checked="" type="checkbox"/>

Figure 4. Reflected data in the musicbrainz importer.

One Use Case is there for the import of already existing data into the new format. To showcase this, we developed a tool, which reads all information about an artist stored at the musicbrainz website. This includes information about the artist itself, about the releases he or she published including the recorded songs, about the songs the artist contributed to and so on. The user can choose which of this data to import and if he wants to change data in order to avoid the adoption of incorrect data. We used reflection to create a hierarchical structure of the data, so the user can choose or change each single data, see Figure 4. This data is then converted to triples and can be written to a Semantic Web data store like the freely available *Virtuoso* server²³⁵ using a standard sparql-endpoint. A sparql-endpoint is a standardised way to access triple stores, with the sql-like language sparql²³⁶. In this process, we query for other data that might be used for our new objects. For example, we query *dbpedia*²³⁷ for URIs about places. The artist ‘mollust’ from our example comes from Germany, so we store the URI for Germany from *dbpedia* <<http://dbpedia.org/resources/Germany>>. This way we can link the information about the origin of the band to information that is stored about Germany in any other knowledge base.

In the same manner, it is possible to create tools that import data from any other data source that stores information about artists and their works. Everybody can contribute writing converters and offer this service to players in the music business.

Another tool we want to present is a tool that checks the statements for live activities from the German copyright society GEMA for completeness. Nowadays, labels or publishers that want to check these statements have to compare the data from the GEMA manually with their records of reported live performances of their artists. This can take days or weeks, depending on the number of represented artists and their live activity. Many labels omit this check for the huge amount of effort it takes; thereby forgo a significant amount of revenues for them and their artists.

²³⁵ <http://virtuoso.openlinksw.com/>

²³⁶ <http://www.w3.org/TR/sparql11-query/>

²³⁷ <http://dbpedia.org/About>

Tag der Show	Artist	Venue	Location	Veranstalter	Sparte	Anz
27.12.2012	[REDACTED]	Moritzbastei	04109 Leipzig	Moritzbastei	U	0
28.12.2012	[REDACTED]	Moritzbastei	04109 Leipzig	Moritzbastei	U	0
31.12.2012	[REDACTED]	Panorama- tower	04109 Leipzig	Panorama- tower	U	0
20.01.2013	[REDACTED]	Franz Mehlhose	99048 Erfurt	Franz Mehlhose / Ralf Neues	U	1
08.06.2013	[REDACTED]	Dr.Seltsam	04227 Leipzig	Dr. Seltsam	U	1

Figure 5. Checker for GEMA statements.

The tool, which is depicted in Figure 3, reads the statements sent from the GEMA and the data about the reported performances from the artists. Today, this data comes from excel sheets administered by the label or publishers, but within a fully supported MBO-environment, this data could be simply extracted from a triple store. As a side effect, the data from the GEMA can be converted to triples and stored in the company's triple store the same time, giving access to it to other tools or applications. For example, there could be a tool that calculates the artists' share of the statements.

With the available data, the tool checks the GEMA statement and creates lists for performances that are completely missing in the payoff, also giving suggestions for payoffs that might not be assigned due to data errors, as well as a list for incomplete playlists and performances accounted in the wrong category. These results can be written to a csv-format file, which can be sent as a complaint to the GEMA. The time saving is huge and it is less error-prone than a manual check.

There are other tools prototyped like the import of distributor statements and the export of those statements into an enterprise resource planning system. With a handful of tools that use the MBO as a shared database, the need to manually copy data in the music business, as it is nowadays, could be reduced significantly. This would result in better data quality and time saving on the administrative side, which can be invested in the promotion and support of the artists.

6 Conclusion

In this paper, we presented a pre-study with the aim of analyzing the demand of the music industry towards tools and services. As a basis for new services and tools, we developed the MBO - a first conceptual draft of a semantic data description standard. The MBO as an open and freely accessible framework is a lightweight yet powerful approach for structuring music business metadata. Structured metadata is an essential requirement for reliable, redundancy free and efficient interfaces and communication between software systems of the various players of the music industry.

Hence, the results of the paper were twofold. First, we highlighted actual problems in the music industry and outlined the specifics of the music industry collected in workshops and interviews. Based on these findings the MBO was developed as a possible solution. Correspondingly, the concepts and properties of the MBO were introduced.

As the resulting ontology can be used for future developments of integrated software and services, various tools addressing the specific challenges of the music industry were described in different use cases. In that way, the applicability of the MBO could be illustrated exemplarily.

The future work consists mainly of two major aspects. First, the development of the MBO has to be extended to a broader range of players of the music industry. Thereby, the concepts and properties of the MBO can be evaluated, completed and possibly corrected. Second, an institutional construct needs to be established to give the MBO a frame in form and content. This would allow for a controlled and directed development and professional dissemination of the ontology.

The presented results and principles are easily extendible to other parts of the creative industry like literature or film as they also deal with virtual assets and have to keep track of the use of their individual properties. The same issues and technology that arise from virtualization of the works can be observed for example at the book market, where eBooks compete with traditional hard- or softcover books. And the idea of streaming music also emerges in the eBook market²³⁸ nowadays.

²³⁸ <http://www.marketplace.org/topics/business/streaming-books-amazon>

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Examining ingredients for new business models in public service networks

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Abstract. *Both service-dominant logic and cultural-historical activity theory see the relation between services and customers as foundational. This paper proposes that different types of service-client relations in public services could be seen as relevant characteristics, or ingredients, for building efficient and effective business models for public service networks. Three types of relations are depicted, based on Vygoda's (2002) and author's previous studies: responsiveness, collaboration, and justice. Ordinary service situations in two public service networks, the social services for divorced families, and the supervised probationary freedom, are then empirically examined with these relation types.*

1 Introduction

The core of a service is the support provided by one party for another party's practices and processes. Public services refer to services that are created through the public policy process and regulated by government but which can be provided by a range of public, third and private organizations (Osborne; Strokosh, 2013, 32). The political and policy context is essential in public services which imply that the interests and outcome expectations are multiple and even contested. Moreover, the public service users can be, contrary to private ones, unwilling or coerced (Osborne; Strokosh, 2013, 37). Actual pressures of public services ask for renewal in the business models public service organizations (Osborne et al., 2014) and in the relation between public administration and citizens (Vigoda, 2002). This paper attempts to enrich the discussion about business models with an activity theoretical systemic approach, applied in the study of public service networks.

The aim of the paper is, first, to interpret and enrich the notion of a business model with an 'activity concept' in order to shed light to how business models are carried out in practice. Traditionally, business models are used for analysing and developing strategies. Here I take another perspective where ordinary service practices are analysed as manifesting strategic ingredients of business models. *Possibly, this may help in strengthening the theoretical underpinning of the business model concept.* The second aim to investigate a supposed change in public service - client relation, and articulate three types of relation – responsive, collaborative, and justice. Based on a recent study on public service networks (Seppänen et al., 2013; Seppänen et al. 2014), these types seem developmentally relevant. Third, the aim is to empirically analyse, how these types of client-service relations are acted out in ordinary situations of networking services. In order to develop services and service business models, practitioners and managers alike need to see how the logics or principles of different business models translate in practical services. Therefore, their contextual and practical identification and interpretation is important.

The investigation of ingredients of business models will be based on literature review and on findings from a recent study on service networks (Seppänen et al. 2014). The empirical material comes from two different service networks: supervised probationary freedom (SPF) from state-level criminal sanctions, and social services for divorced families (SSDF) from municipal social work that both deal with complex social and societal questions. The data consist of transcribed discussions from developmental workshops where the professionals of SPF and SSDF networks, correspondingly, discussed about the trajectories of their common clients.

The findings illustrate in what ways responsive, collaborative and justice relations between clients and public services, understood as ingredients designing business models, are contextualized and concretized in the ordinary service situations of public service networks. They also reveal some of the organizational, cultural and legal conditions that either enable or hinder working according to these types of relations. These findings may contribute to business model design also by helping to elaborate concepts and methods for learning with which service actors may better understand and develop the services.

With these aims, this paper is an attempt to make a contribution towards depicting ingredients for types of networked business models in public services in which the relation between service providers and service users is taken as the starting point. The paper is a preliminary investigation into these themes.

2 Business models, service-dominant logic and activity concepts of networks

2.1 What are business models?

Business models provide a set of generic level descriptors of how a firm organises itself to create and distribute value in a profitable manner (Baden-Fuller; Morgan, 2010, 157). It is defined in many ways, such as 'the set of which activities a firm performs, how it performs them, and when it performs them (Afuah, 2004), 'the logic of the firm, the way it operates and how it creates value for its stakeholders' (Casadesus; Ricart, 2010), and 'a system of interdependent

activities that transcends the focal firm and spans its boundaries' (Zott; Amitt, 2010). It addresses the 'how' of providing customers and end-users with products and services (Mitchell; Cole ref. in Zott; Amit, 2010), or is a 'cross roads for competence and consumer needs' (Sabatier et al. 2010). Business models have a long history, ranging from guild and craft systems to mass production and further to new emerging technology- and network based or cost-innovative models.

Business models operate at an intermediate level between the real world of firms and theories of firm behaviour: they are neither so general that they fail to distinguish firms' main relevant differences, nor are they too particular and detailed (Baden-Fuller; Morgan, 2010, 159). There are no fixed number of business models as labelled boxes, because the characteristics, or ingredients, based on which business models are formed change over time as things in the world develop. Each different way of sorting may reveal different aspects to be of importance. Business models can be constructed both by observation and empirical work (taxonomy) and conceptual and theoretical work (typology), their combination yielding Weberian 'ideal types' such as business models. (Baden-Fuller; Morgan 2010, 159-161).

Conceptualizing the multi-level changes taking place at work is necessary for promoting well-being (Launis et al. 2007). Experiences from developmental interventions suggest that creating and using representations of activity theoretically informed business models may help practitioners better cope with the changes and fare better overall (Seppänen et al. 2009). This is especially important in contexts of complex inter-organizational collaborations. The aim of this paper is, both theoretically and empirically, to examine some ingredients, or characteristics, for conceptualizing business models. These ingredients may give means of expression for describing and building new business models.

2.2 Service-customer relation as fundamental in service dominant logic and activity concepts

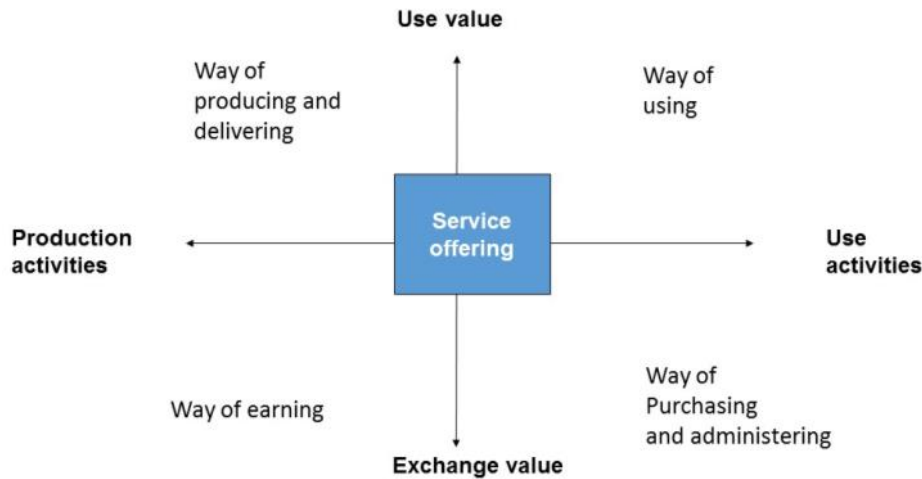
2.2.1 Service-Dominant (SD) logic

S-D logic says that the application of competences (that is, the service) for the benefit of another party is the foundation of all economic exchange (Vargo; Lusch, 2008,4). It is basically about co-creation. It happens when people specialize through developing competences, and exchange services for services based on these specialized competences (Lusch; Vargo, 2006, 406-407). The marketplace, with its fundamentals of money, goods, organization and networks, mediate this basic exchange. Simultaneously, this mediation blurs, or masks, the fundamental principle of service exchange (Lusch; Vargo, 2006, 410), which in turn gives rise to division of labour, organizations, and learning. Not only services, but also values, dialogue, processes and networks are co-created. S-D logic views marketing as the process in society and organizations that facilitates voluntary exchange through collaborative relationships that create reciprocal value through the application of complementary resources (Lusch; Vargo, 2006, 408).

For the interest of this paper, three points are interesting in S-D-logic. The first of them is the the exchange of services as the foundation of economic activities. We will come back to this later. Second, it sees that customers are always co-creators of value. Value is created in customers' processes as value-in-use, which implies that service is inherently customer-oriented: it is a a mediating factor in the process of value creation. Third, value is experientially (phenomenologically) determined by the beneficiary of the service, which emphasizes the *relational* nature of services.

2.2.2 Activity concepts and networks

Activity concepts refer to a notion, idea or logic according to which a certain entirety is built, functions and develops (Virkkunen et al., 2010). Two basic dimensions are essential in an activity concept: the relation of exchange between producer and user, and the relation between use value and exchange value (Virkkunen 2007). In all productive activities in the market economy there is a fundamental inner contradiction between the use value of the product or service and its exchange value in the markets (Virkkunen 2007). Use value means the benefit for the service users in their activities. Exchange value means the general value, mostly understood as money and price.



(Virkkunen et. Al, 2010, 45)

Activity concepts are materialized into ‘recurring patterns of purposeful activity that are distributed over people and technologies in work practice’ (Hall & Horn, 2012, p. 241). Smagorinsky (2012) proposes a notion of a practical concept, consisting of fragmented understandings that are inherently compromised by attention to contradictory means of mediation in their contexts. We need to pay attention to the practicality of the activity concepts, that is, ‘a good enough’ concept, responding sufficiently to many needs. Both production and use are human activities which are, crucially, processes of transforming an object into an outcome. Analytically it is possible (and perhaps necessary) to distinguish two sides or levels of the object in public services: the societal needs (referring to service practitioners’ understandings of the general overall goal) and the concrete, particular client.

Business models and activity concepts share an interest in the logics or principles of how value is created. Both of them may function as models, by providing means for description and classification, by operating as sites for research, and by acting as recipes for managers and practitioners (Baden-Fuller; Morgan, 2010, 156). The notion of an activity concept may enrich insights into business models in at least three ways:

1) An activity concept always *exists in the practice of work*, regardless of its degree of explicitness or articulation. In this sense, it differs from an organization concept, defined by Heusinkveld et al. (2013, p 9), which is a more or less coherent prescriptive vision, that includes guidelines for managers and other organizational members regarding how to deal with specific organizational issues, and is known by a particular label. As activity concepts ‘live’ within work and collaboration, they are never totally fixed and stable and thus, rather than trying to make a clear definition, characterizing phenomena is more convenient than trying to completely describe it (Marková 2000).

2) Activity concepts focus on and depict qualitative changes in forms of work activities and include activity’s societal purpose. One point of reference in the examination of activity concepts involves historical types of work such as craft, or standardized or flexible mass production (Victor & Boynton 1998; Pihlaja 2005; Launis & Pihlaja 2007).

3) The process of analysis of activity concepts, mediated by a developmental methodology in activity theoretical research, often includes, in one way or another, the perspective and intentionality of the actors/subjects. This has at least two implications. First, universal concepts of high level of abstraction, such as historical types of work or activity concepts created by researchers only, are not necessarily the best ones in understanding and promoting change in the practices of a particular domain (Seppänen 2004, 40). Second, the notion of an activity concept has potential for understanding meaningfulness and well-being at work, and in particular, their relation to changes at work. Talking about, and in particular experimenting with activity concept reveals and may articulate an activity’s quality which in turn has implications for reflection and learning on the one hand, and for branding and commodification on the other. An activity concepts’s capability to reveal new qualities of work activities has resemblance to the notion of a transpersonal dimension of activity (Clot & Kostulski 2011, 685), which concerns the historical memory of the profession that contribute to making the work “doable”.

Based on understanding of objects in cultural-historical activity theory (Engeström, 1987), it is their many-sidedness, complexity and multi-faceted nature that makes a need for *network collaboration*, because different service activities or functional units, as a result of specialization and division of tasks, are unable alone to deal with such objects (Seppänen et al., 2012). Service networks make new relationships and new configurations of elements possible and in this way increase positional value (Norman 2001, p 114). It is expected that network collaboration is increasingly part of any work in the future (Alasoini et al., 2012). Network concepts are more complex than activity concepts in terms of mediations, social relations and objects. So far, there is very little research done on network concepts. The networks increases the complexity of tasks of individual practitioners but is also a potential for expanding the object and thus increasing motivation and better seeing developmental possibilities. The notion of an ‘offering’ (Norman 2001, 118) also makes a need to depict activity concepts or business models for service networks. The activity system perspective to business models (Zott; Amit, 2010), and open business models using the growing division of innovation

labor (Chesbrough, 2006, 2), come close to the idea of a service network of this paper. Public services need to be outward-focused on external effectiveness for service users and on creating sustainable public value for local communities. Sustainable public services are dependent upon building long-term relationships across service systems rather than seeking short-term discrete and transactional value. (Osborne et al. 2014, 170).

S-D logic brings not only the customer to the process of co-creation of value, but also the organization's partners throughout the value creation network. Lusch; Vargo, 2006, 408). This is because S-D logic views knowledge as the fundamental source of competitive advantage, and collaboration is needed to take into use the knowledge that is dispersed in the marketing system and society.

2.2.3 Types of public service-client -relations

If, as suggested by both S-D-logic and activity theory, the relation between service providers and service users is crucial in order to understand and develop services' business models, we need a typology for empirically investigating this relation in service. Therefore, we turn to notions of responsiveness and collaboration as elaborated by Vigoda (2002).

Vigoda (2002) depicts an evolutionary continuum of public administration-citizen interaction. While the question of public services and service users is narrower than this, the proposed historical phases might anyway help us understand the nature of co-production or co-creation between public services and users. The oldest type of public administration-citizen-interaction is *coercive* which existed until mid-or late eighteenth century. Services were limited and citizens had very little power and control over services. The installation of the voter electoral system changed the interaction into *delegation*: citizens were given an option of voice, but only through representatives and intervals of time. Simple delegation type of relationship between rulers and citizens was not enough, which gave a need for change efforts through the NPM (new Public Management) movement (Vigoda 2002, 532).

A major belief among NPM advocates views citizens as clients and customers of the public sector. A major goal of government is to show high responsiveness to the public by satisfying their demands. *Responsiveness* as a type of interaction (or relation), in short, means that public service organizations and their actors respond to needs and exigencies of their clients and customers. Responsiveness follows a market logic and, basically, is promoted by New Public Management. According to Vigoda 2002, there are two approaches for understanding public administration's responsiveness. First, it may be viewed as a necessary evil that contradicts the value of public service professionalism and runs counter to public interests required by the society and policy. The second approach to responsiveness suggests that democracy requires administrators who are responsive to popular will, and only by creating a market-driven environment can public services adopt necessary reforms to improve their performance, effectiveness and efficiency (Vigoda, 2002, 528). A responsive professional is reactive, sympathetic, sensitive, and capable of feeling customers' needs.

Moreover, Vigoda (2002) distinguishes *collaboration* (partnership) from *responsiveness* in the relationship between citizens and the public sector. Collaboration is necessary because, according to Vigoda, responsiveness, with its terms *customer* or *client*, gives only passive role to service users and does not encourage their participation or contribution to society or to citizenry actions. The actual evolution of public administration-citizen interaction should go towards rational and applicable levels of integration among all social players, and collaboration is a way to do that (Vigoda, 2002, 535). Contrary to responsiveness, the nature of collaboration is negotiation, participation, cooperation, free and unlimited flow of information, innovation, agreements based on compromises and mutual understanding, and a more equitable distribution of power and resources. This goes counter to Weberian legacy of clear hierarchical order, which is still strong in public services (Vigoda 2002, 529). For service users, the collaborative approach asks for extensive responsibilities and involvement on the part of the public (Vigoda, 2002, 535).

My understanding of the collaborative type of relation between service providers and users is informed by relational agency as theorized by Anne Edwards. Put simply, it means that the resources or perspectives that others bring to problems can enhance understandings and can enrich service responses (Edwards, 2010, 13). Therefore, the relational turn

... "brings with it demands for new configurations of practices which require organizations to focus more on revealing the complexity of problems and on supporting and developing the expertise of practitioners, than offering either the comfort of routines or the tight prescriptions of targets" (Edwards, 2010, 13).

Osborne et al. (2014, 170) propose that the key resource and route to effectiveness for public service organizations is knowledge (both of professionals and of service users) and the key tools for its transformation into successful public services are relational rather than discrete and transactional comes. Relational agency (Edwards 2010) may well be a necessary mechanism to enhance knowledge-based effectiveness in public services.

The distinction between responsiveness and collaboration fits very well to our investigations of client understanding public service networks (Seppänen et al., 2013, Seppänen et al., 2014). However, they are not enough because also bureaucratic hierarchy and juridical issues seem to affect a lot the relation between public services and users. Juridical issues in public services is typical to Nordic welfare states where the role of public control/regulation is considerable. Moreover, social services are seen to become increasingly judicialized, which

means that issues or phenomena become juridical, are increasingly controlled by regulations or become objects for judicial settlement. It also has positive effects, such as transparency through registering and justification, and by protecting clients' rights. But mostly, judicialization is considered negative because the emphasis on juridical concerns may pass issues of ethics, care and interaction. A legalistic social work does not necessarily provide help for families or protection for children. Moreover, it may lead to a situation where societal problems are argued about as judicial. (Sinko, 2004).

The similarity of S-D logic and activity theory is that the microlevel activities in the client-service relation is the fundamental base of services, and changing this relation implies transforming the division of labor and organization through strategies. Also Osborne et al. (2014, 170) suggest that co-production is at the heart of public service delivery and is the source both of effective performance and of innovation in public services. They both, as I understand, support bottom-up approach to renewing business models.

As S-D logic and activity theory suggest, the exchange relation between service provider and the customer/service user is foundational, this has at least two implications. First, this relation, in all its aspects, is also central to business models of services. Second, then we need a typology with which we can distinguish between different types of exchange relations. The conceptualization of Vigoda (2002) above seems promising for this purpose. Before empirically testing these types, we take a look at the public service networks.

3 Supervised probationary freedom (SPF) and Social services for divorced families (SSDF)

The interest of this paper is the operational and dynamic client-service relation in two public service networks. Social services for divorced families with children (SSDF) have lately emerged as activities that should rather be developed together in their entirety, than each of them separately. The purpose of these services are to increase families' well-being and to protect the children. The central partners in SSDF are family counseling, family law issues and child protection. When parents divorce, often municipal family law issues helps parents make and verifies an agreement between parents on the different matters concerning the children. If parents are not able to agree, the issues are solved in the magistrate's court. Child protection gets involved when concern for the child arises, caused by, for example difficulties in care and upbringing, violence, drug use or other crises. Divorced families can turn to family counseling, which helps in questions related to the upbringing of children and adolescents, and in problematic or crisis family situations. Family counseling collaborates closely with child psychiatry clinics. These three specialized social services combine, in different ways, the legal and aid systems: Family law issues often performs assignments for the magistrate's court in legal issues, while family counseling is voluntary. Child protection works on both voluntary and legal levels.

The SSDF network of this study deals particularly the services around prolonged divorce cases where the families use many services. Often, the customers experience these services as fragmented (Schaupp et al., 2013). The divorced parents have ownership to their matters, except when they (voluntarily) take their case to magistrate's court.

Supervised probationary freedom (SPF) means that, if certain prerequisites are met, prisoners are released from prison up to six months prior to the time they would otherwise have been released. One of the main objectives of SPF, which became law in 2006, is to decrease the use of prisons by emphasizing sanctions that both cost less and are more effective in preventing crimes. During SPF, prisoners are required to take part in activities such as working, studying or rehabilitation. Based on the aims designed individually for each prisoner at the start of the sentence, the content of SPF, written in an enforcement plan, is drawn up so that it promotes these aims. SPF may help a person return to normal society by softening the boundary between life inside and outside prison.

The way in which SPF is designed enables prisoners' participation in it. Participation is directional because SPF is a purposeful and normative project that aims to promote prisoners' redirection towards a crimeless and normal life in society. The degree of prisoners' participation and agency vary and depend on the interactions during the design and implementation of SPF.

The SPF network is established and institutionalized as a network. The SSDF network is not institutionalized, and mostly functions occasionally, although its separate functions are institutionalized. Both SSDF and SPF services are free of charge for clients. The funding (exchange value) for SSDF is municipal. In SPF, Criminal Sanctions Agency is funded by government, but a municipality (where the prisoner comes from) has to pay certain services during SPF such as housing, education or rehabilitation. These services can be provided by public, private, or third sector organizations. From the point of the crucial relation between use and exchange values, the ways and indicators of how these services are evaluated are very significant and need to be considered in designing business models. Table 1 condenses the main features of SPF and SSDF customers and networks.

Table 1. Features of SPF and SSDF networks.

Feature	SPF	SSDF
Client	Selected prisoners at the end of their prison sentence.	Divorced families with children who have long-term relations with various social and legal services.
Clients' agency	Conditioned by the prison and SPF rules. Prisoners participate in SPF design and their agency increases stepwise in the sentence trajectory.	Parents have ownership of their own matters throughout the trajectory, except when they take a matter to court.
Use value for clients	Helping return to society from the prison, enhancing conditions for crimeless life.	Advice, help and support during divorces.
Use value for society	Overall security, diminishing crimes.	Overall well-being of families, children's rights.
Funding (Exchange value)	Mainly state funded. Municipalities are responsible for funding services outside Criminal Sanctions Agency (CSA) during SPF.	Funded by municipalities.
Service actors in the network	In Criminal Sanctions Agency: Prisons, assessment center, surveillance patrols controlling during SPF and community sanctions offices. Outside CSA: municipal social care, workplaces, rehabilitation centers, residential or other NGOs, schools, police etc.	In municipal social services: Family legal issues, child protection and family counseling. Child psychiatry clinics, magistrate's courts, schools, health care, police etc.
Network features	More hierarchical (CSA is responsible).	Flatter (no clear hierarchy between the three municipal social services).

While SPF as part of criminal sanctions is coercive, prisoners still can be called clients because the strategic goal of Criminal Sanctions Agency, enhancing returning to crimeless life, is not possible in the long term without prisoners' own motivation and agency. Also SSDF has some coercive elements.

4 Data and methods: multi-voiced workshop discussions

The data consist of two 3-hour workshop meetings, one from SSDF, one from SPF, in which data regarding the processes of clients, a prisoner 'Steve' and a family T, were jointly discussed and analysed among professionals of these services. Part of the participants had been involved in the services of these clients. This kind of data offers an intermediary perspective to client-service relations in between face-to-face interaction and strategic level. First, 127 microepisodes including professionals' talk about both customers' matters and network relations were identified. The main focus of analysis was the customer-service activities and events taking place outside the meeting. Originally the microepisodes were identified and analysed for the purpose of examining *mismatches* between services and clients (Seppänen, Cerf & Toiviainen, 2013 where data and method are described more in detail: see also Seppänen; Kloetzer, in press).

Here I analyze the relational categories of responsiveness, collaboration and justice in these microepisodes with a following method. First, only those episodes showing practical service situations were selected (consisting of 63% in SPF, and 60% in SSDF, of the total episode data). Episodes about abstract features or future desires were thus omitted. Each episode was named according to the situation it was about - one single situation could be discussed in many episodes. After this, episodes were interpreted and categorized into responsive, collaborative or justice type of relation between service providers and clients.

The situations are complex and interpreting the type of relation in them is not easy. The data is from a discussion where multiple networking service providers together reflect on the service trajectories of their common clients and thus there are many perspectives and voices concerning one situation. In the data the situations are often expressed narratively. A perspective, or voice, towards a situation has analogy with a story: a situation is one and shared, but there can be many stories about it. The relational categorization, therefore, is based on both content analysis and the way how professionals talk about the situations. One situation may include many types of relations. 22 and 17 situations were found in SPF and SSDF data correspondingly.

Situation as a unit of analysis helps us examine the complex context in the practical, ordinary service activities. As a result of this complexity, it was necessary to form new categories of 'unresponsiveness' and 'anti-collaboration'. The most interesting is the contextual quality of the relation types. I introduce the findings below.

5 Responsive, collaborative and justice relations in SSDF and SPF networks

Tables 2 and 3 show the situations according to the relational categories.

Table 2. Situations in social services for divorced families manifesting different kinds of service-client -relations.

Relation types	Situations
Responsive relation	5 Examining alternatives for custody from clients' own social networks 9 Obtaining information and support from the network 11 Making way and space between the child and parents' quarrel 13 Getting a reliable adult contact for the child 16 Leading the service network
Unresponsive relation	1 Rules of getting psychiatric therapy to a child 6 A social worker's visit to a child's home
Collaborative relation	3 A network meeting with parents 5 Discussing alternatives with clients' own social networks
Anticollabo-rative relation	17 A school is involved in the family's quarrel 3 A network meeting with parents
Justice relation	1 Rules of getting psychiatric therapy to a child 7 Hearing of the 12-year-old's opinion 8 Parents' agreement about meeting the child does not come true 9 Parents' fight yields in a park a child welfare announcement 10 Hard measures are needed for maintaining child-father contacts

A relation of a situation is *responsive* is when service providers, in one way or another, make an effort to help a client. More specifically, a service shows responsiveness when clients' particularities and own situations are considered. For instance, professionals in SSDF may have experimented with new methods of working and learned something from them (Table 2, situations 5,11 and 13). Or, as expressed in many SPF situations of this category, responsiveness is already embedded in the concept and instructions for designing supervised probationary freedom. Besides immediate relations, I have classified as responsive also 'back office' type of operations if they aim at improving service quality for clients. Quantitatively, this category is common in both service networks but it is proportionally more prevalent in SSDF than in SPF.

Analysis of data reveals also that some basically responsive service situations do not reach, for some reason or another, the needs of the client, or clients experience these services uncomfortable or unsuitable. I call this a category (or possibly a subcategory) of '*unresponsive relations*'. For instance, in social services for the divorced, the client may find there a standard practice of a social worker visiting a child in his/her home as threatening (situation 6, in Table 2).

Table 3. Situations in supervised probationary freedom manifesting different kinds of service-client -relations.

Relation types	Situations
Responsive relation	8 Deciding about the length of SPF 12 Prisoners' friends being present in SPF activities 13 Designing peer support in an NGO 18 Sharing client information in the service network 21 Support for being a parent
Unresponsive relation	3 Prisoner's escape and return 6 Prisoner's mates as risks for offenses 9 Many SPF activities as a problem for the prisoner
Collaborative relation	7 Prisoner wakes up the SPF process 14 Negotiation during SPF control visit to the prison 16 Prisoners' impact on the SPF contents
Anticollabo-rative relation	10 Prisoner freezes completely in a network meeting of authorities

Relation types	Situations
Justice relation	1 SPF is cancelled (due to offences) before starting 2 Finding out information about the prisoner for deciding about SPF 4 Prisoner's permission before talking about his/her issues 5 Revoking SPF due to an offense 8 Deciding about the length of SPF 9 Designing SPF activities 11 SPF control visit interrupts prisoner's school lesson 15 Isolating the prisoner during SPF 17 Giving SPF enforcement plan to his service providers

Situations in the category of *collaborative* relation include either negotiation between service professionals and clients, or show that clients' agency is positively needed or considered in providing the services. As an example, family counselling and child psychiatrist, together with other service providers, organized a network meeting together with the parents to discuss the matters of their child. This situation occurred out of the child's need and is not a standard practice in the local social work. Collaborative situations of SSDF are occasional while the collaborative nature of SPF situations is coded in the standard practices of probationary freedom. We thus see that strategic guidelines are a powerful way to enable (but not guarantee) collaboration.

Similar to unresponsive relations, some collaborative situations seem to work against good attempts of the services. In the situations of '*anti-collaborative relations*', collaboration takes place, but their outcome is negative for a particular client, or even negative for the common, societal purpose of the services. For instance, revealed by a small story of a social worker, a school became so involved in the parents' dispute that it became impossible for their child to attend that school anymore. Anti-collaborative and unresponsive relations show the delicate nature of service- client relations in these public services. Responsiveness or collaboration as such do not guarantee the success of the services.

The juridical elements SSDF and SPF service networks can be seen in the 'justice relation' -category. Naturally, this category is more prevalent in SPF than in SSDF.

The justice relation –situations reveal some of the legal and institutional constraints that restrict possibilities for responsiveness or collaboration. For instance, there is a rule that a prisoner must remain sober during SPF preparation time. If s/he breaks this rule then the preparation, with all its collaboration, is interrupted. This is a problem for service providers because a lot of work done becomes wasted. Some of these situations show principles that affect services a lot. In SSDF, the main official principle, in divorces where both parents share the custody, is to try to maintain the relationship between children and the parent with whom the children do not live, which is often the father. Sometimes this may go counter to responsiveness in terms of what children want. The principles and legal issues behind justice relations –situations can also be seen as frames within which professionals do have professional contentual autonomy to act (Sinko, 2004; Rostila; Vinnurva 2013, 198). Standardized procedures and formalization contribute to efficient and effective services (Walsh; Dewar 1987) and also support service professionals in their work.

Many of the justice-relation type of situations show that the legal or formalized procedures are immediately negative for clients, but in the long term they may support clients' acting according to what is societally good. Also, sometimes procedures can be based on assumptions that do not correspond to clients' lives. For instance, psychotherapy, according to experts, is not suitable for children where circumstances in the family are not stable. This is based on an assumption that an unstable phase for children is short, and does not go on for years as sometimes is the case. In these cases, being responsive requires finding innovative solutions, as our studies have been able to show (Seppänen et al., 2013; Seppänen et al., 2014).

Many of the situations of this category show that the formalized procedures also protect clients' rights. For instance, for privacy protection reasons, only the prisoner has a right to share his/her SPF enforcement plan, approved and largely made by prison authorities, to those actors outside Criminal Sanctions Agency that provide services or activities to him/her during SPF.

Justice relations not only hinder responsiveness and collaboration, they also may offer places for acting responsively or collaboratively. For instance, in SSDF, when a child becomes 12 years old, s/he may decide not to meet the father. This decision is respected despite the general norm of supporting child-parent relations of social services. This legal principle thus opens up a new avenue for responsiveness and negotiation between the client and public services.

6 Discussion and conclusion

If we take seriously the message of SDL, then new vocabularies for better understanding different service-customer – relations are needed. Many initiatives and projects, in social and health services or the services for the unemployed for instance, are enhancing clients' activeness. Customer orientation is central in the developmental rhetoric of both private and public sectors. Virtanen et al. (2011) distinguish client centric from client-oriented way of developing services. The former means that clients' needs are considered, but the client is not able to influence on how the service is provided. This roughly corresponds to responsiveness. In the latter client orientation, the client participates to both design and

realization of services, where the actor moves from the service provider to 'we', including both client and service provider. This roughly corresponds to Vigoda's collaboration. But the notion of collaboration, to me, much better informs the relevant characteristic of what Virtanen et al. (2011) call customer-orientedness. The distinction between responsiveness and collaboration (Vigoda 2002) seems important for opening up some crucial distinctions of client-service relation, and for developing business models for public services. If clients' activeness is a strategically important, then the difference between responsive and collaborative relations need to be distinguished in all levels and activities of the services. The purpose for identifying responsive and collaborative relations in service practices is to try to find relevant ingredients for building business models or activity concepts that potentially would contribute to making public services more efficient and effective. This paper is a preliminary examination in the operative level of two public service networks.

The analysis shows that identifying responsiveness from collaboration is not easy. Based on the findings in SSDF and SPF networks, they both are needed when modelling activities in public service networks. Responsive, collaborative and justice relations are also intertwined and condition each other, which makes their identification even more important. For instance, turning to clients' own social networks is a responsive way of looking for good solutions for a particular client, but when put into practice, collaborative relation is needed. The justice type of relations show that the challenge for learning and business model building for public services is not only to move from responsiveness to collaboration, but can sometimes be moving to responsiveness. Maybe the justice type, rather than a service-client relation, should be considered more as a characteristic of the public service context which enables and restricts responsiveness and collaboration in different ways.

The findings concerning collaborative and anti-collaborative types of relation show that collaboration and partnership require specific capabilities and skills to be successful. Learning collaboration, in the case of enhancing clients' activeness and participation in providing and developing public services, seems to be a major long-term educational effort for all parties.

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Institutional pluralism as a driver for innovation

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Recent research points to a service-based and systemic understanding of innovation in which focus is on the shared value co-creation practices shaped collaboratively by many actors. This research seeks to understand where and how new value co-creation practices emerge. Institutional pluralism, or the diversity of rules, norms and schemas that constrain and guide human action, offers the basis for answering this question. Actors encounter contradictory situations when multiple prescriptions for action are activated in a specific situation. This elevates their conscious problem solving which allows them to develop new solutions to resolve issues at hand, these solutions carrying the potential for institutionalization across a broader system. This view has implications for studying innovation at both micro and macro levels.

1 Introduction

Since Schumpeter's (1934 / 1983) seminal work, innovation studies have provided a number of insights into the emergence of new solutions. One of the more recent developments in the innovation literature is the integration of products and services within a single framework for studying innovations (e.g., Drejer, 2004). Coombs and Miles (2000), for example, suggest that the value of physical products derives from the services they deliver, portraying service as the more foundational aspect for understanding innovation. Similarly, but more extensively, Vargo and Lusch (2004, 2008) suggest that service (singular) is the fundamental basis for exchange. They define service as the application of competences for the benefit of other actors (and the actor itself), proposing that innovation is not concerned primarily with the creation of new material artifacts or technologies, but the creation of new service practices (which may or may not make use of various artifacts) that offer solutions to human problems (Vargo et al., forthcoming).

In this context, innovation is not a lone effort of one actor, but shaped by multiple actors interacting in various networks (Coombs; Miles, 2000). Vargo and Lusch (2011) promote a networked view of value creation and innovation, in which all actors are resource integrators and service providers participating in collaborative value creation (value co-creation) processes in service ecosystems (see also Lusch; Vargo, 2014). Similarly, innovation literature illustrates the networked processes through which many actors integrate their resources to develop new solutions in specific systems (e.g., de Vries, 2006; Windrum; García-Goñi, 2008). As many actors interact in shared systems, over time they develop shared practices for value co-creation. Taking an institutional lens, these practices are both constrained and enabled by the shared rules, norms and schemas actors develop (Scott, 2014). In this context, innovation is not only concerned with the initial and local emergence of novel solutions, but their institutionalization across a broader system (Vargo et al., forthcoming), that is, the development of patterned problem-solving behaviors and shared meanings associated with these behaviors that persist over time (Berger; Luckman, 1966; Tolbert; Zucker, 1996; Zucker, 1977).

While existing research on innovation at the systems level has begun to elaborate the complex processes through which shared, institutionalized practices change and evolve (e.g., Coriat; Weinstein, 2002; Geels, 2004), this research offers only limited insights into the initial emergence of new solutions within the broader institutional contexts. Furthermore, micro level research often ignores the institutional dimension, focusing solely on the actions of a specific entrepreneur or organization as if they were unconstrained by the rules, norms and habits of surrounding contexts. Thus, the question for our research is: Where and how do new solutions – new value co-creation practices – emerge?

Building on recent advances in marketing, particularly service-dominant logic, and organizational institutional theory, our purpose is to develop a more complete view of the emergence of innovation. In particular, our aim is to describe how individual actors, in and through local interactions, are able to endogenously set in motion changes in the systems of which they are part. Our key argument is that due to the pluralism and diversity of constraining and enabling institutions inherent to human life, contradictions surface in the day-to-day conduct of actors providing opportunities for reforming and reframing existing solutions. To fully elaborate this argument, we proceed in three stages. First, we offer an overview of the service-based view to innovation, laying the foundation for more detailed analysis. Second, our paper expands the systemic and networked dimension of innovation by introducing the concepts of service ecosystems and institutions in the analysis. The third section leverages recent advances in organizational institutional theory to focus on the emergence of contradictions at the intersections of different institutions, and how they enable the creation of new solutions by individual actors. We conclude with a discussion of the implications of this view for theorizing and studying innovation.

ILLUSTRATION: *A case study of the Finnish residential sector*

Throughout the article, we will illustrate our conceptual arguments with examples from an empirical case study in the Finnish residential sector. These examples draw from over 70 interviews conducted with various actors in the field seeking to understand the institutional diversity in the residential field, as well as the innovation efforts of individuals and organizations operating in the nexus of multiple institutions. Thus, these examples offer an illustration of the intersection between micro-level actions of individual organizations aimed at innovation, and the field-level institutional forces shaping, and being shaped by, these actions. Before moving on in the institutional dimension, however, we will start with an overview into the service-based notion of innovation, as it constitutes the conceptual basis for the remainder of the article.

2 Service-based view to innovation

Recent developments in innovation research emphasize service as the foundational basis for studying innovation, allowing researchers to transcend the classic dichotomy between products and services as separate entities. The essence of this view is that the value of physical products derives from the service they render. This has important implications for research on innovation (Coombs; Miles, 2000: 101): First, it portrays innovation as a result of intertwined and complex material and immaterial changes (cf. Gallouj; Weinstein, 1997), as opposed to occurring solely in the product (output), or process. Second, the locus of innovation shifts from intra-organizational R&D processes to networked processes among many actors within and between organizations contributing to the shaping of new solutions. Third, these shifts imply that the overall notion of innovation expands from the production of novel material or immaterial outputs to entrepreneurial acts which change existing (social and) market relationships and may, or may not, involve material novelties.

Vargo and Lusch (e.g., 2004, 2008, 2011) echo, extend, and elaborate this further by viewing service, and not tangible goods, as the fundamental basis of exchange. Service-dominant (S-D) logic defines *service* (singular) as the application of competences for the benefit of other actors or the actor itself (Lusch; Vargo, 2014), distinguishing the singular notion of service from services (plural) understood as immaterial outputs of firm-driven production processes. S-D logic perceives all actors (e.g., “producers” and “consumers”) as resource integrators who use their competences and other resources to integrate them with resources acquired from others to solve specific problems (i.e., create value), for others and for themselves. This implies that no actor creates value alone; instead, value is always co-created in the ongoing resource integration and reciprocal service provision among many actors (Lusch; Vargo, 2014; Vargo; Lusch, 2004). The service-based view, therefore, portrays innovation both resulting in, and being driven by, the ongoing value co-creation practices by many actors integrating and exchanging their (specialized) resources with those of others for specific purposes (cf. Vargo et al., forthcoming).

By reframing innovation as change in the value co-creation practices shared by many actors, S-D logic offers an overarching and integrative view of innovation across all economic and social contexts. As mentioned, such view is not completely new to innovation studies. In addition to Coombs and Miles (2000), Gallouj and Weinstein (1997) offer a synthesizing view to innovation by describing innovations as novel combinations of technical and competence characteristics that jointly contribute to the formation of new final characteristics. In align with S-D logic, the characteristics-based model highlights innovations as new combinations of operand (technical) and operant (competence) resources that allow actors to co-create value in novel ways, resulting in new experiences of value-in-context (final characteristics) for specific beneficiaries (e.g., Lusch; Vargo, 2014). More recent evolutions of the characteristics-based model suggest that these novel combinations are not crafted by individual actors, but emerge as a result of networks of actors contributing their technologies and competences to the creation of the novel solution (de Vries, 2006). Furthermore, actors’ preferences in such networks determine how available artifacts and competences are integrated into novel solutions, pointing towards an increasingly systemic view of innovation (Windrum; García-Goñi, 2008).

This systemic view is further elaborated by S-D logic in its focus on resources as interconnected and dynamically evolving: As new resources are created by integrating existing resources in novel ways, their utilization in value co-creation processes requires the adaptation of other resources with which the new resources are integrated (Lusch; Vargo, 2014; Penrose, 1959/1995). Thus, resources are not inherently ‘valuable’, but become more or less valuable depending on the context of their integration (Chandler; Vargo, 2011). Examples of such dynamics are present in early studies of technological and organizational innovation (e.g., Abernathy; Clark, 1985; Damanpour; Evan, 1984), in which technological renewals were considered destroying existing organizational competences and requiring reorganization to leverage the potential of new technologies for value creation. More generally, the fact that resources configure other resources means that value creation, and innovation, inherently intertwines with the surrounding system, requiring the consideration of systems of many actors acting in concert to co-create value in new ways.

CASE STUDY, PART 1: Dominant logics in the residential sector

The context of the case study, residential sector, can be characterized as following a ‘goods-dominant’ logic in the way it perceives its primary purpose and core functions. The development and maintenance of residential properties, tangible assets, lies at the heart of most organizations in the field, from funding agencies to developers, investors, and various organizations responsible for the maintenance of the buildings. In recent years, however, actors are increasingly framing their operations in the field as serving the residents, questioning some of the long-held assumptions and core values of the traditionally production-centered field. This emerging shift aligns with the distinction between goods- and service-dominant logics: the former emphasizes the production and exchange of tangible assets, buildings, whereas the latter draws into limelight the value co-created with the residents inhabiting the buildings and using them as one of the critical resources in constructing their everyday lives. Thus, the notion of value also changes as organizations move from a goods- to service-based interpretation of their purpose and action: In the former approach, apartments are considered as investment assets (valuable on their own), while the latter approach perceives value as co-created with the residents, emerging only when the apartments are integrated with other necessary resources in the residents’ environment and daily life. The emerging divide between goods- and service-dominant interpretations also entails differing emphasis on resources and resource integration: the goods-dominant interpretation of the residential field emphasizes efficient supply chains, sourcing strategies, and marketing channels, while the service-dominant interpretation more closely considers the integration of various applied resources (i.e. service) – including the apartments – from various sources for the benefit of the residents.

3 Ecosystems and institutions

The emerging systemic view of innovation emphasizes the networked and distributed character of value creation. As Vargo and Lusch (2004, 2008) state, no actor alone creates value. More specifically, this view portrays all actors, whether individuals or organizations, as resource integrators (Vargo; Lusch, 2011) intertwined in a complex web of service-for-service exchange relationships unfolding over time and space (Lusch; Vargo, 2014). As discussed in the previous section, the networked resource integration by many actors continually shapes the contexts for subsequent resource integration and service provision, transposing the networks into dynamically evolving systems (Vargo; Lusch, 2011). This dynamic systems view is encapsulated in the concept of *service ecosystems*, defined as relatively self-contained, self-adjusting systems of resource-integrating actors that are connected by shared institutional logics and mutual value creation through service exchange (Lusch; Vargo, 2014: 24). In other words, the service ecosystems perspective describes dynamically evolving systems of actors interrelated through the activities of resource integration and service provision, and characterized by the formation of shared *institutions* with distinct logics of action that allow actors to interact and co-create value efficiently.

Institutions describe the enduring aspects of social systems and human life (cf. Giddens, 1984). Scott (2014: 56) defines institutions as the “*regulative, normative and cultural-cognitive elements that, together with associated activities and resources, provide stability and meaning to social life*”. In other words, institutions consist of formalized rules such as laws, less formalized norms including social expectations and values that define legitimate behavior, as well as cultural assumptions and cognitive frames or schemas that encapsulate the taken-for-granted assumptions and beliefs concerning social action in specific situations. Institutions are not objective and immutable, but constantly created and re-created by value co-creating actors (Lusch; Vargo, 2014). The service ecosystems view thus adopts the structuration view by Giddens (1984), who perceives institutions as both the medium and outcome of human practices. Thus, actors simultaneously draw from and produce the social structures – institutions – that guide them. In this view, institutions only exist in the instantiations of human practice, as well as in the memory traces of human actors, without having any objective existence (ibid.).

In this sense, institutions can be considered as the structuring properties of service ecosystems; they are the constraining and enabling structures (Sewell, 1992) which lend ecosystems their systemic ‘form’ by shaping resource integration and value creation among actors (Lusch; Vargo, 2014). The perspective for innovation thus expands beyond the discovery of a novel artifact to the unfolding of change in the institutionalized value co-creating practices of a service ecosystem (Vargo et al., forthcoming). In other words, the focus expands from the emergence of new solutions to their *institutionalization* across the ecosystem (ibid.). Here, institutionalization is understood as the development of patterned problem-solving behaviors (habitualization), the development of shared meanings associated with these behaviors (objectification), as well as the sedimentation of these behaviors into the social fabric (Berger; Luckman, 1966; Tolbert; Zucker, 1996; Zucker, 1977). The implication of this view is that, as opposed to perceiving innovations as created by unconstrained individual actors (usually firms), innovations are seen as constantly unfolding sequences of dynamic interactions among human actors, material artifacts and the governing institutions (Geels, 2004) that shape the search for, and formation of, new or better solutions to identified problems.

CASE STUDY, PART 2: Institutions in the residential sector

The residential sector draws attention to various institutions at the regulative, normative, and cultural-cognitive levels. In addition to general legislation, national building codes as well as regional and municipal zoning regulations provide the regulative contexts for organizations operating in the residential sector. Industry norms, such as common contracting practices, establish normative guidelines for legitimate action. Finally, the taken-for-granted cultural assumptions and schemas involve specific ideas of how, for example, the construction process, property management practice, or provision of maintenance services should proceed, constituting the core of the industry practices among the organizations. These include more general frames such as ideas or principles of technical and economic performing in the field, or more specific templates for specialized tasks such as contracting suppliers, performing specific maintenance tasks, or pouring concrete. From the residents' perspective, the meanings associated with what housing is and should be, how homes function and are organized, as well as how they relate to the broader environment also derive from institutionalized notions of the role of housing in the society. In addition to these cultural-cognitive institutions, shared norms on how to behave with neighbors, for example, and the legislation that governs housing from the residents' perspective, represent other aspects of institutions enacted by the residents. Finally, interactions between different organizations and residents are also constrained and enabled by various institutions. Legislation on rental agreements is an example of a regulatory institution that dictates the roles and responsibilities of the tenant and landlord. Norms associated with property transactions and real estate brokerage offer another example of the institutions that influence exchanges between the "producers" and "consumers".

4 Institutional pluralism as the driver for innovation

The service ecosystems view broadens the basis for understanding value creation and innovation in human systems. On the one hand, it portrays actors' resources as configured by other available resources, implying that value co-creation opportunities depend on, and are configured by context(s) actors themselves shape (Vargo; Lusch, 2011). On the other hand, it also draws attention to the institutions that govern resource integration and service provision in ecosystems, suggesting that human actors are not unconstrained agents, but constrained and guided by the existing rules, norms and schemas according to which they reproduce large parts of their daily life to preserve the stability and order in their day-to-day interactions (Lusch; Vargo, 2014). However, while the structuration view explains institutions as constantly produced and reproduced by actors in their social practices (Giddens, 1984), it does not offer a detailed view of how actors simultaneously reproduce institutions, that is, repeat institutionalized patterns of behavior, and consciously create novel solutions from available resources that diverge from the preexisting patterns of social action. For our attempt to understand the emergence of innovations, the question is: How actors are able to change the very institutions that govern them (e.g., Garud et al., 2007)?

One answer to this question is rooted in the fact that actors in service ecosystems are simultaneously governed by, or draw from, many institutions each with a distinct logic (Lusch; Vargo, 2014). These *institutional logics* are defined as "*the socially constructed, historical patterns of cultural symbols and material practices, including assumptions, values and beliefs, by which individuals and organizations provide meaning to their daily activity, organize time and space, and reproduce their lives and experiences*" (Thornton et al., 2012: 2). The existence of multiple institutional logics – *institutional pluralism* (e.g., Kraatz; Block, 2008) – means that institutions do not exist in isolation. Instead, institutions need to be understood through the mutually dependent yet contradictory relationships between multiple institutional logics (Friedland; Alford, 1991), each applying to specific spheres or situations in the diversity of human life (Ostrom, 2005). In this sense, institutional pluralism is constitutive to human systems, social action, and innovation.

The consequence of institutional pluralism is that actors often encounter situations in which many institutional logics offer contradicting and conflicting interpretations of, and prescriptions for, action (Friedland; Alford, 1991; Greenwood et al., 2011). In the context of service ecosystems, for example, the intersecting and overlapping institutional logics can create conflicting views on what value is, and how resources should be integrated for value co-creation (Vargo et al., forthcoming). In our view, these conflicts lie at the heart of innovation: When actors encounter situations with contradictory prescriptions from multiple institutional logics, the taken-for-grantedness of institutionalized practices breaks down and elevates conscious attention to resolving the conflict (Seo; Creed, 2002). Conflicts between logics thus activate praxis, that is, the free and creative reconstruction of social patterns based on reasoned analysis, that allows actors to envision and enact novel solutions in the complex situation (ibid., see also Thornton et al., 2012).

This means that conflicts between prescriptions from multiple institutional logics – *institutional complexity* (Greenwood et al., 2011) – can be seen as the potential locus for innovation. It is only potential in the sense that actors are not forced to find a novel solution, but can resort to preserving existing solutions and avoiding or defying the conflicts deriving from institutional complexity (e.g., Kraatz; Block, 2008; Lawrence; Suddaby, 2006; Oliver, 1991). In addition to activating actors' conscious attention to finding a resolution, multiple institutional logics also offer actors the tools with which new solutions to complex situations can be developed. In align with S-D logic, actors do not develop new resources and meanings associated with them 'out of thin air', but access the existing practices and symbols from the ecosystems, and the associated institutional logics, in which they are currently embedded (Thornton et al., 2012).

Institutional pluralism thus provides actors with multiple available ‘cultural toolkits’ or strategies of action, with which new solutions to complex situations can be developed, including both material practices and symbolic resources for meaning (re-) construction (Greenwood; Suddaby, 2006; Swidler, 1986).

Taking a more detailed view to institutional complexity, conflicts between logics can unfold on at least two distinct levels, goals and means (Pache; Santos, 2010). When multiple means (i.e., specific practices prescribed by an institutional logic for achieving a particular goal) run into conflict, the reconciliation may more likely focus on the reorganization or recombining of material tasks and associated competences. As an example, changes in the hiring routines in the Danish Learning Lab were driven by conflicts with the governing state organization, leading to a trial-and-error process of the organization seeking a routine that would satisfy the demands behind both the bureaucratic (state) and innovative (Danish Learning Lab) means for hiring professionals (Rerup; Feldman, 2011). Conflicts over goals, or deeper meanings associated with specific situations, may create more profound and severe conflicts that can lead to political contestation and the amplification of the conflict across broader ecosystems. Such conflicts derive from completely different interpretations of the situation, and differing views of legitimate goals, implying very different grounds for action and evaluating what is right or just (cf. Boltanski; Thevenot, 2006; Thornton et al., 2012). Empirical studies in institutional literature offer a number examples of contested change processes unfolding in the nexus of conflicting “world views”, including those between market and professional logics (e.g., Suddaby; Greenwood, 2005; Thornton; Ocasio, 1999), or between environmentalism and industrial logics (e.g., Hoffman, 1999; Zietsma; Lawrence, 2010).

This view of the innovation process, emphasizing conflicts and their resolution, takes a *dialectical* perspective in which the contradiction between thesis and antithesis – here, incompatible aspects (e.g., identities, goals or practices) of different institutional logics – are reconciled in synthesis (e.g., Hargrave; Van de Ven, 2009; Seo; Creed, 2002). Dialectical view fits well with the notion of pluralism central to the current argument, since conflicts between different institutional logics are viewed as the driving force for improvement. Smith and Lewis (2011) offer a detailed view of the dialectical process. They start with the notion of latent paradoxes or conflicts which permeate human systems characterized by pluralism. In certain situations, some aspects of these latent conflicts become salient, activating action towards reconciliation. While the system can deteriorate under complex pressures if actors are unable to develop new courses of action, actors can also build acceptance to embrace the tensions (‘truce’), and eventually, seek to develop transcending solutions that integrate the conflicting sides in a manner that resolves the tensions more permanently (‘synthesis’). Central to the dialectical view is its cyclical nature: synthesis of one conflict constitutes the thesis for another conflict, offering a view of system-level evolution based on recurring dialectical cycles that drive innovation (see also Van de Ven; Poole, 1995).

Finally, our previous consideration offers an endogenous view of the micro-foundations of innovation, drawing attention to emerging contradictions, and dialectical processes that reconcile them, at the heart of innovation (Bledow et al., 2009). This means that despite their institutional embeddedness, actors are capable of performing *institutional work*, defined as the purposive action of individuals and organizations aimed at creating, maintaining and disrupting institutions (Lawrence; Suddaby, 2006). The resulting view of innovation is therefore one in which multiple actors, driven by different goals and possessing different means, perform different types of institutional work thus contributing to the emergence and institutionalization of novel solutions through distributed and networked processes. This view blurs the traditional boundary between discovery and diffusion (e.g., Rogers, 1995 / 1962), as all actors are considered, in the least, as adopters of novel solutions to their unique contexts. In this sense, all actors perform translations through which actors identify problems or problematize situations, develop bridges between conflicting views by manipulating resources, and mobilize actors (including themselves) behind new solutions and roles that associate with them (e.g., Callon, 1986). In this sense, translations drive the (ongoing) institutionalization of novel solutions (Vargo et al., forthcoming).

CASE STUDY, PART 3: Institutional complexities as the drivers for innovation

Building on the descriptions of goods- and service-dominant logics in the Finnish residential sector presented in part 1, we identified two institutional logics offering contradictory frames or interpretive schemas for organizations making sense of their purpose and practices in the sector. The goods-oriented frame portrays buildings as the key assets to be developed and maintained, emphasizing technical and investment practices at the heart of operations. Although residents are considered important, they are perceived as the ‘buyers’ (or renters) of standard products, with whom the organizations interact at an arm’s length. The service-based frame, on the other hand, emphasizes the value co-created with residents through multiple channels, platforms or offerings, only some of which the particular organization provides. In this frame, the role of the organization is to facilitate these processes and offer means for residents to integrate various elements for consistent experiences that fit their context and need. Thus, the field is characterized by an emerging conflict between the frames deriving from the dominant, building-based logic, and the emerging, resident-centered logic, providing platforms for developing new solutions.

The emergence of the resident-centered logic is central to the increase of conscious attention in the field towards fitting these two logics together for more sustainable business. In our case study, different organizations dealt with this complexity in different ways: Some, including many building investors, denied the legitimacy of the resident-centered

logic as viable and feasible basis for operations. Others attempted to incorporate both frames in their operations by combining the existing, building-centered practices with the resident-centered service practices in their organization. Finally, some organizations even provided overarching solutions that reconciled the conflicts between the logics more durably by developing novel organization forms and practices rooted in 'hybrid' frames that created the basis for new value creating practices between the organization and residents.

In addition to developing different 'ranges' of solutions to the complex pressures, the case study also illustrates both types of conflicts, over goals and means, and different types of solutions envisioned in response to these conflicts. The introduction of a home renovation service by a property investor offers one example of reconciling a conflict over means, in which the incompatible practices between managing a mass of properties and serving individual households were fitted inside the organization by compartmentalizing different practices into different organizational subunits. Conflicts over goals were present in a publicly owned investor organization whose owner, a municipality, required the organization to simultaneously seek efficient operations around the building-based logic to provide low-cost housing, and seek to improve resident welfare through various support-oriented means. The development of a hybrid frame that legitimized both goals inside the organization created the basis for the ability of the organization to simultaneously address diverse needs of their residents.

The examples above illustrate institutional complexities as the locus and driver for the creation of novel practices and frames. These practices and frames offer other actors in the field templates for resolving similar problems with conflicting institutional logics, their adoption facilitated by interactions with other organizations in shared forums (e.g., industry associations), and by observing how others use the solutions. Examples in the case study show that these templates are not often adopted in full, but as parts of broader toolkits 'tailored' to the idiosyncratic context of the adopting organization.

5 Discussion

The central argument of this paper is that innovations stem from contradictions between multiple institutional logics that impose pressures on actors by prescribing different courses of action, or different goals and interpretations of the situation at hand. Contradictory pressures elevate actors' conscious and creative problem solving, and allow them to recombine available resources for new purposes. In other words, institutional complexities 'loosen' the taken-for-grantedness of the ways resources are applied to specific purposes, and allow actors to envision and experiment with new uses and solutions. As this unfolds over time and place, novel solutions that initially emerge in one context may institutionalize as more and more actors adopt, or translate, these solutions in their contexts by reconfiguring their resources. This view is rooted in a dialectical view of change (Van de Ven; Poole, 1995), in which recurring cycles elevate and address conflicts, producing gradually evolving solutions that characterize specific service ecosystems. This view differs radically from the classic linear models of innovation, drawing attention to non-linear, dynamic, iterative, distributed and experimental processes at the heart of innovation (e.g., Cheng; van de Ven, 1996; Garud; Karnøe, 2003; Moorman; Miner, 1998; Toivonen; Tuominen, 2009; Van de Ven et al., 1999).

For macro-level studies on innovation, this paper proposes an endogenous mechanism for system-level change, according to which actors adapt and recombine existing resources to resolve contradictions between institutional logics. This view expands current literature, which, for the most part, emphasizes the role of exogenous shocks as the source of change in socio-technical systems (e.g., Geels, 2004; Sine; David, 2003). In this sense, our conceptualization of ecosystems differs from the punctuated equilibrium models of innovation which consider systems as inherently stable, occasionally disturbed by shocks that cause discontinuous shifts in the value co-creation practices. On the contrary, our dialectical view portrays ecosystems as structured by multiple institutional logics, the overlaps and contradictions of which shape the ongoing dynamic processes through which actors shape, produce and reproduce, the systems (Friedland; Alford, 1991). This view can provide valuable new insights for studies of innovation systems, especially the multi-level perspectives that map changes in technological regimes in the nexus of institutional rules and socio-technical practices (e.g., Coriat; Weinstein, 2002; Geels, 2002; Geels, 2004). Fuenfschilling and Truffer (2014) offer one interesting avenue for future research by elaborating on institutional pluralism as the basis for understanding technological regimes, as opposed to uniform institutions changed by exogenous shocks. Another interesting avenue for future research may unfold around the recurring dialectical processes that reinforce path-dependent trajectories of ecosystems (cf. Garud; Karnøe, 2003).

In the context of micro-level studies of innovation, our contribution lies in elaborating the institutional embeddedness of individual actors. Traditionally, innovation research has considered individual actors, whether entrepreneurs or firms, as somewhat heroic individuals as the creators of novel solutions, unbound by existing structures. Our thinking, on the contrary, roots agency that transforms solutions and ecosystems in actors' simultaneous embeddedness in multiple institutions with distinct logics of action, which provide both the loci and resources for the creative reconstruction activated by conflicting institutional prescriptions. Thus, rather than rising above the constraints, the institutional entrepreneurs "hop and bridge from one social world to another" in constructing change (Thornton; Ocasio, 2008: 117). In align with our view, the concept of bricolage (Levi-Strauss, 1966) offers a view of innovators as

entrepreneurs making do with resources at hand, refusing to enact the limitations of resources as they recombine available resources for new purposes (Baker; Nelson, 2005). Building on this notion, future research on the micro level could benefit from more detailed accounts of how novel recombinations of resources (i.e., new solutions) emerge, and especially how the innovators or entrepreneurs give meaning to these solution so as to legitimize them and facilitate their institutionalization (e.g., Christiansen; Lounsbury, 2013; Garud et al., 2014; Suddaby; Greenwood, 2005). In addition, future research could benefit from explicit attention to the multiple institutional logics that guide the behavior of individual actors during different stages of the innovation process, and how these logics blend or reform as a result of actors' purposive work.

Finally, our systemic and dialectical view of innovation also has implications to strategy as a part of innovation. The traditional notion of strategy places strong emphasis on prediction, that is, developing explicit goals for action by collecting and analyzing data from the environment. However, the dynamic systems view draws attention to distributed processes laden with discontinuities and unintended consequences. This means that the more rapidly an ecosystem changes, the less effective are predictive strategies. Sarasvathy (2001) proposes the logic of *effectuation* as an alternative to prediction, which, like bricolage, emphasizes the means available to actors, and the ends attainable to those means, as the basis of action and innovation. Selecting between the various possible ends attainable using the means at hand unfolds in recurring cycles in which the entrepreneur seeks commitments from new stakeholders (e.g., partners, investors, suppliers, customers) to gain new resources necessary for improving and expanding the possible solutions. At the same time, however, new stakeholders impose their constraints on the new solution, leading to the convergence of goals around specific solutions (Sarasvathy; Dew, 2005). Thus, innovation strategy in effectuation is of an emergent kind, developed in networks of actors, emphasizing control over emerging futures rather than prediction of inherently uncertain futures (Wiltbank et al., 2006). An interesting question for future studies on innovation is to what extent, and how, effectual processes apply to, and unfold in, established organizations and highly institutionalized contexts with more constraining structures in place.

6 Conclusions

The service-based conceptualization of social and economic activity makes visible the underlying basis of innovation rooted in service, that is, the application of competences for the benefit of others (Vargo; Lusch, 2004). This view expands to a systemic understanding of value creation and innovation, in which no actor is able to create value alone, or change the shared value co-creation practices. Instead, actors collaboratively integrate resources in service ecosystems governed by shared institutional logics. In this context, the notion of innovation expands from the local development of novel technologies to the institutionalization of novel value creating practices (Vargo et al., forthcoming), requiring an explanation for how the actors become able to change the very institutional structures that govern their value co-creation. Institutional pluralism offers the basis for a conceptual solution in which conflicts between multiple institutional logics elevate actors' attention to problem solving, and allow them to creatively combine resources from multiple sources for new purposes. This view radically expands the scope of innovation studies, not only offering an alternative to the traditional dichotomy between produces and services, but also linking the micro and macro levels of analysis into a systemic understanding of innovation. In this sense, service-based conceptualization of innovation appears increasingly central to the formulation of future agenda for innovation research.

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The impact of service characteristics on trade: evidence from Belgian enterprises

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The paper examines empirically the link between service characteristics, cross-border trade and sales of foreign affiliates using micro data held by the National Bank of Belgium over the period 1997-2005. Service characteristics related to tangibility exercise a particularly strong influence on exports and imports, while characteristics relating to search-experience-credence, proximity and border location particularly affect the choice of entry mode for trade in services. For foreign affiliates, service characteristics seldom affect the value of sales. Firms which operate in less competitive markets domestically have less incentive to trade cross-border, while lack of competition on the Belgian market attracts foreign investors.

1 Introduction

The low level of cross-border trade in services lacks as yet a fully satisfactory explanation in spite of their growing tradability through the application of information technology. A number of barriers to trade have been identified, many of which relate to the inherent characteristics of services (Canoy; Smith, 2008). These characteristics apply equally to domestic markets and an issue to be explained is why these attributes affect the sale of services cross-border so much more than domestic ones.

This paper innovates first in exploring the different ways in which service characteristics affect trade. Second it looks at how these characteristics should affect the amount of and choice between cross-border trade and permanent presence. Third it tests whether observed characteristics do in fact affect the value of trade in services in the way predicted and which of the different characteristics are most significant in explaining the value of trade. In order to do so the paper uses a unique set of panel data on nearly all individual enterprises for the period 1997-2005 held by the National Bank of Belgium²³⁹. The choice of Belgium has both advantages and disadvantages. The country can be considered representative of the small open services-oriented economies of north west Europe and we would expect to see more trade in services from this type of economy than for the larger developed economies or the smaller less service oriented ones. The disadvantage is that the need to specialise inherent in small economies may mean that trade in services is biased towards those services in which the country has a comparative advantage.

Section two provides a literature review of the characteristics of services and how they can affect trade – whether cross-border or through the establishment of a permanent presence. Section three sets out the hypotheses to be tested and section four develops the methodology to be applied. Section five describes the data used to apply the methodology. Section six presents the results. Section seven examines some implications of the results for policy. Section eight concludes.

2 Literature review

One strand of the literature from economics looks at how characteristics of goods and services influence the functioning of markets and provides a theoretical foundation for these interactions. Another strand of the literature from marketing takes the theoretical categories developed in economics and tests them empirically against observed outcomes. The two strands are therefore complementary. The literature on international trade and investment remains very general when making the connection between characteristics and trade.

2.1 Characteristics of Services

Gadrey (2000), building on Hill (1977), examines different approaches to defining services. The earliest, or classical approach, applies various technical criteria to either the output or the process. The first and most obvious characteristic of services relates to intangibility. To be more precise: “The final output of the activity is material if it takes the form of tangible things that have an existence in time and space that is independent from that of their producers, their consumers and the production processes that led to their creation.”(Gadrey, 2000) The second relates to the interaction between producer and consumer in achieving the desired outcome. The third concerns the fact that goods are both storable and transportable.

None of these criteria provide a hard and fast way of distinguishing between goods and services. It may indeed be more useful to consider goods and services as a continuum along different dimensions rather than as two separate

²³⁹ The author wishes to thank the National Bank of Belgium for providing access to their data for this research and in particular to Catherine Fuss and Philippe De Coninck.

entities (Araujo; Spring, 2006). The relative impact of different characteristics can then be evaluated through their variation across services. To the extent that goods also display differences across the same dimensions, this allows a confirmation of the results obtained from the study of services.

The literature on marketing has indeed exploited technical characteristics of services to examine their impact on consumer behaviour (Gabbott; Hogg, 1994). This approach derives from the economic literature on consumer behaviour and in particular the observation that goods are valued for the attributes they possess and that differentiated products are essentially different packages of attributes (Auld, 1972; Ratchford, 1975). The development of electronic commerce has given a new impulsion to the study of the relationship between service characteristics and purchasing behaviour. Because purchases over the internet can easily be supplied also cross-border, differences between internet and bricks-and-mortar behaviour may also provide some insights into the reasons behind and potential for cross-border trade in services.

Fundamental for consumers is how to obtain information about the service, comparing alternative providers and evaluating the service encounter (Ostrom; Iacobucci, 1995). The first two elements apply equally to goods. The early services literature placed the major emphasis on issues of intangibility and explored different implications of this dimension (Levitt, 1981). Because intangible products are more difficult to evaluate they increase the level of uncertainty and perceived risk of consumers.

Laroche et al. look at intangibility as a construct rather than as a way of distinguishing goods from services (Laroche; Bergeron; Goutland, 2001). Intangibility is usually defined negatively as something that cannot be touched, smelled or seen. This first dimension concerns physical intangibility. However there are other dimensions to the construct. Generality refers to the degree to which a consumer can define or describe a particular product. A third dimension, mental intangibility refers to the degree to which a product is capable of clear mental representation even where it is physically tangible. It is a step beyond generality. Mental intangibility is identified as the most important dimension of intangibility by Laroche et al. They find that some services are rated as significantly more tangible than some goods.

The three dimensions of intangibility are linked to the perceived difficulty of evaluation. They are also linked to perceived risk of purchase both directly and indirectly through the difficulty of evaluation. Contrary to received wisdom, physical intangibility should yield an easier evaluation process since it relies on prior experience rather than an assessment based on physical attribute. Online purchasing is found to reduce evaluation difficulty. However the link between evaluation difficulty and perceived risk is observed as stronger in the online compared to the offline situation, leading to overall greater perceived risk for online purchasing (Laroche; Yang; McDougall; Bergeron, 2005).

The economics literature on search, experience and credence goods (S-E-C) has proved a rich source of understanding for the functioning of markets for services as well as for goods. Nelson developed the categories of search and experience goods in his article on information and consumer behaviour to which Darby and Karni added that of credence goods (Nelson, 1970; Darby; Karni, 1973). Search goods are those for which it is possible to accurately predict quality before purchase while the quality of experience goods can only be determined by use and experience after purchase. With credence goods the consumer can ex post only observe but may not be able to assess quality even after purchase (Dulleck; Kerschbamer, 2006).

In his study of automobile insurance as an experience good, Israel shows that not all experience goods are alike and that experience with a service can be described as a learning process which depends on the characteristics of the service and that initial expectations about quality may be far from that actually provided (Israel, 2005). Villas-Boas points out when purchasing a product, a consumer learns about its valuation. As a result that product has an informational advantage over products that have not been tried in future periods (Villas-Boas, 2006). Since experience goods must be purchased in order to assess quality, there is path dependency according to which product has been purchased first.

Even in the case of credence goods there can be a search element in the form of a second opinion (Wolinsky, 1993). This form of search is costly and the ability of the customer to accurately choose the best offer among those contacted not guaranteed. The alternative is reputation where the seller invests in maintaining reputation in order in order to keep repeat customers or to attract new ones.

Ford et al. make the important point that a good or service may contain aspects of different attributes so that it is difficult to categorise a product as exclusively search, experience or credence in nature (Ford; Smith; Swasy, 1988). In practice, this difficulty can be circumvented by rating products on the different dimensions so that they contain in a certain sense a bundle of attributes. A second important point is that characteristics may change over time. Thus credence goods may become search goods if unverifiable claims such as those for environmental sustainability are backed up by credible controls on, for example, eco-labelling (Grolleau; BenAbid, 2001).

A number of studies apply the S-E-C framework to online purchasing (Girard; Silverblatt; Korgaonkar, 2002; 2006). Verhagen et al. use the S-E-C framework as a control for the effect of the attributes of intangibility. (Verhagen; Boter; Adelaar, 2010). Girard et al. examine the extent to which the willingness to shop on the internet differs according to the product category. Overall they conclude that products that are costly and difficult to evaluate are the least likely to succeed on the Internet. Huang et al find that significant differences in consumers' perceived ability to evaluate product quality before purchase between search and experience goods in traditional retail environments become blurred in online ones (Huang; Lurie; Mitra, 2009). The presence of product reviews from other consumers and multimedia that enable consumers to interact with products before purchase has a greater effect on consumer behaviour for experience than for search goods.

It should be remarked that both the studies relating to intangibility and those using the S-E-C framework explicitly or implicitly deal with the issue of information and how it affects the purchase decision. They should be related to the economics literature on information and markets and in particular to that on asymmetric information (Grossman; Stiglitz, 1980). Imperfect competition is one consequence for markets with asymmetric information. Nevertheless markets exist and function so that mechanisms have developed to overcome the imperfect information problem among which one can cite reputation, certification, guarantees and prices themselves (Stiglitz, 1989; Huck; Tyran, 2004; McDevitt, 2011). Vernon Smith points out that there is no imperfection in a market possessing incomplete information if it would not be remunerative to acquire complete knowledge (Smith, 2008). He goes further in stating that even markets with imperfect information work remarkably well. Support for Vernon's position comes from a paper on executive search by Clark, who found that in the face of information asymmetries market based solutions such as contingent fees and familiarity gained from past transactions with clients served to generate trust between search consultancies and clients (Clark, 2001).

Inseparability of the production and consumption aspects of the transaction has also been identified as crucial (Lovelock, 1983). The degree of customisation varies widely from one service to another. Some are quite standardised (public transport, fast food); others require customisation. Even there, the contact with personnel may be quite limited to for example taking an order while in other cases it is extensive (professional services, household repairs). There is therefore a relational as well as a spatial dimension to the interactions between customers and suppliers.

The burden of proximity takes on different values according to whether and the extent to which the customer needs to be either physically or mentally present. For example, automated teller machines do not require the customer and the supplier both be present but the location of the service provision is constrained. Telephone banking does not require physical colocation but involves a mental exchange between the two parties. Internet banking requires neither a physical nor a mental exchange to take place.

2.2 Trade and characteristics of services

While the literature, both theoretical and empirical, on the relationship between characteristics of goods and services and markets is quite rich, that on the impact of characteristics on trade is sparse. In line with the accepted definition of trade in the World Trade Organisation and the European Union, trade in services comprises both cross-border trade and permanent presence. Therefore, the way in which characteristics of services affect sales of foreign affiliates as well as cross-border trade and the choice between exports and establishment abroad needs to be examined.

At the highest level of abstraction transaction costs are incurred when trading either goods and services, whether cross-border or through a commercial presence. It is the nature and amount of these costs compared to those incurred by domestic suppliers that determines to a large degree the amount of trade (Anderson; van Wincoop, 2004). Trade costs indeed are as applicable to services as they are to goods (Miroudot; Sauvage; Shepherd, 2013). A second, less apparent way in which services become tradable is when they can be embedded in a good or another service which is traded, even though no financial flow may be associated with it. This is typically the case for a service that is part of a joint product with a good, such as after-sales service.

Hirsch provides a theoretical justification for the importance of distance for trade in services based on the inherent characteristics of services (Hirsch, 1989). His analysis of trade in services turns around the degree and forms of interaction between producer and user, which is formalised as the fraction of the total costs of service to the user incurred during that interaction. To the extent that cost and time of travel depends on distance, one would expect that services requiring proximity would be most likely to be affected by distance and therefore depress cross-border trade. But, interaction between producer and user no longer needs to take place at the same location. Technology obviously facilitates such interaction. For example Skype allows anyone with an internet connection to engage in such interaction for a modest cost. We can expect that technology will increasingly weaken the effect of proximity on trade as it has already for services that can be supplied over the internet. In the end it may be that rather few services will be constrained by the need for proximity.

The second issue to be addressed is how service characteristics affect the choice between cross-border trade and commercial presence. The literature on foreign direct investment (FDI) for goods is vast but much more limited for services. Dunning examined why foreign direct investment has been the preferred route for organizing cross-border activities involving services (Dunning, 1989). To produce and market services more successfully than their competitors, multi-national enterprises (MNE) need to possess specific ownership advantages which they can exploit by choosing where to engage in production (locational choice advantages). Thus in terms of the impact on internationalisation of services, there must be both an advantage to produce locally rather than export cross-border and for the MNE to possess specific advantages over domestic competitors. Services for which much of the knowledge is proprietary, those that rely on brand name or image to protect quality and trade-related service affiliates like Japanese trading companies are likely to trade through foreign affiliates. Papers by Christen and Francois (2009) and Fillat-Castejón, Francois and Wörz (2009) both look at permanent presence and cross-border trade in services as alternative or complementary ways in which firms internationalise their service operations. Neither look specifically at service characteristics as determinants of FDI.

Blomstermo et al. examine foreign market entry mode for hard and soft services (Blomstermo; Sharma; Sallis, 2006). Hard services are those where production and consumption can be decoupled and are therefore tradable cross-

border. They expect hard services with a relatively high degree of tangibility and low demand for physical interaction between producer and customer to be exported or licensed. With soft services, where production and consumption occur simultaneously, decoupling is not viable. Highly personalised services requiring much personal contact are more likely to be offered through either a high control mode such as a local subsidiary or a low control mode such as licensing or franchising a local supplier rather than exported.

Examining the impact of service characteristics on trade should be subject to two important caveats. Service characteristics can have the effect of limiting competition on the domestic market and diminishing the incentives for companies to go abroad. In that case there will be a spurious association between service characteristics and absence of trade. It will therefore be necessary to control for domestic market characteristics. Second, and linked to the first, much service specific regulation is based on the need to protect customers against the possible negative effects of service characteristics particularly when such effects are serious in nature or long lasting. Regulation of services often takes the form of an entry barrier and even when non-discriminatory in nature can act to reduce trade again giving rise to a spurious association between service characteristics and absence of trade.

3 Research questions and Hypotheses

This paper explores the extent to which the characteristics of goods and services affect the amount of trade for both cross-border trade and sales of foreign affiliates and the choice of entry mode for foreign firms. In line with the previous discussion, a number of hypotheses can be advanced for subsequent testing (Table 1).

With regard to physical intangibility the impact can operate either through evaluation difficulty and perceived risk of foreign clients or from that of making a service more transportable and storable. Services that can be stored in digital form and transmitted over the internet at close to zero marginal cost can be considered as more rather than less tradable than goods. Speed to market for downloadable services is also practically instantaneous compared to the time it takes to physically transport goods from point of production to point of sale. To the extent that physical tangibility facilitates evaluation and makes a service more transportable and more storable, it is expected to have a positive effect on cross-border trade. Because cross-border trade is less costly for firms than entry by permanent presence, a characteristic that stimulates such trade is likely to be preferred to sales of foreign affiliates (H1 a,b,c).

Even when a service is not physically tangible, it may be easy for the user to grasp its nature and therefore to make an assessment on the basis of objective criteria. Generality measures this dimension and is expected to have a positive influence on cross-border trade. Whether this would also stimulate provision through a permanent presence cannot be deduced a priori and therefore is left indeterminate (H2 a,b,c).

Mental intangibility affects the possibility of evaluation and perceived risk negatively, which in turn increase the importance of trust. Trust and culture are closely linked and consumers tend to prefer services from their own country, from countries with a similar culture to their own and from economically advanced countries (Javalgi; White, 2002). Mental intangibility therefore is likely to depress cross-border trade and is expected to stimulate sales of foreign affiliates because such sales would be considered as less risky by the customer (H3 a,b,c).

Similar considerations apply to the search-experience-credence framework. That is search products provide the greatest incentive to purchase cross-border since this widens the available offer and the attributes are most easy to assess, particularly on price, and therefore bring least risk. The effect on both cross-border trade and share in total trade should be positive while that on sales of foreign affiliates is indeterminate (H4 a,b,c).

Experience and particularly credence goods tend to be less price elastic than search goods and the advantage of purchasing cross-border, for instance over the internet, will be less. Certain experience goods and services, such as air transport, are nevertheless supplied cross-border and the impact on sales of foreign affiliates is expected to be weaker than for credence ones (H5 a,b,c). For the latter, issues related to how to mitigate risk will be more important and these are likely to militate in favour of providing such services through a local presence rather than cross-border (H6 a,b,c).

Table 1. Hypotheses relating to trade and characteristics of services.

Characteristic	Hypothesis	Cross-border trade	Sales of Foreign Affiliates	Share of Cross-border trade in Total trade
Physical Tangibility	H1 (a, b, c)	Positive	Negative	Positive
Generality	H2 (a, b, c)	Positive	Indeterminate	Indeterminate
Mental Intangibility	H3 (a, b, c)	Negative	Positive	Negative
Search	H4 (a, b, c)	Positive	Indeterminate	Positive
Experience	H5 (a, b, c)	Negative	Indeterminate	Indeterminate
Credence	H6 (a, b, c)	Negative	Positive	Negative
Proximity	H7 (a,b,c)	Negative	Positive	Negative
Border	H8 (a,b,c)	Positive	Negative	Positive

The need for physical proximity between supplier and customer constitutes an additional cost for those services over services that can be stored and transmitted in digital form. Cost of transport of both goods and people have been falling but it remains nevertheless more costly to transport persons than goods and services that require either the supplier or the customer to physically move to provide the service cross border is expected to depress cross-border trade in services and encourage supply through sales of foreign affiliates (H7 a,b,c).

The choice between exporting and a permanent presence is likely to be affected also by the physical location of the provider. Just under half (47%) of the population of Belgium lives in an area directly adjacent to an internal border and a similar percentage (48%) of Belgian firms have their headquarters located there as well.²⁴⁰ Very large firms tend to be headquartered in Brussels however. Services that require proximity can be served locally in border regions and with no physical border to impede movement and a common currency it should be feasible to provide very local services in border regions, which should favour both cross-border provision over permanent presence and smaller firms (H8 a,b,c)).

4 Methodology

The effect of service characteristics on trade has been tested empirically by regressing trade in services on different characteristics of 24 services covered by the Extended Balance of Payments Services Classification (EBOPS). Similar regressions were run on trade in 97 categories of goods using level two of the combined nomenclature (CN2) in order to provide a comparison with services. The source of the data in each case is the National Bank of Belgium (see following section).

A first series of service characteristics based on the categories identified by Verhagen et al. cover intangibility and the search-experience-credence framework (Table 2). Each of the dimensions relating to intangibility is covered by responses to three different questions on a seven point Likert scale. Similarly the responses to five different questions on a seven point scale of semantic differentials covers the search-experience-credence framework, three of which relate to search.

It is important to note the way that the responses to these questions are scaled with regard to the hypotheses in the previous section. According to these, the values on physical tangibility and generality should be positively associated with cross-border trade and that for mental intangibility negatively associated. All of the search-experience-credence values should be positively associated with cross-border trade by the way they have been coded because experience and credence questions are coded so that those that are easy to know are coded high.

Table 2. Characteristics of Services.

Physical Intangibility			Generality			Mental Intangibility		
7-point Likert scale from strongly disagree to strongly agree								
This product is very easy to see and touch	I can physically grasp this product	This product is very tangible	I could easily explain many features associated with this product	It is not difficult to give a precise description of this product	It is easy to describe many features related to this product	I need more information about this product in order to form a clear idea of what it is	This is a difficult product to think about	This is not the sort of product that is easy to picture
Touch	Grasp	Tangible	Features	Description	Explain	Information	Think	Picture

Search				Experience	Credence
7-point semantic differentials					
hard to evaluate before purchasing-easy to evaluate before purchasing		hard to describe-easy to describe	hard to inspect before purchasing-easy to inspect before purchasing	difficult to know without experiencing it-easy to know without experiencing it	difficult to know even after experiencing it-easy to know after experiencing it
Evaluate		Portray	Handle	Experience	Credence

Source: Verhagen et al.

Responses to each question for each of the goods or services were coded by three different coders at a Belgian university²⁴¹. Since the constructs to be measured as well as the variables to measure these constructs have been developed in previous studies, confirmatory factor analysis was employed to ensure that the latent variables of interest were being satisfactorily described by the variables as coded for trade in services. The use of seven point Likert or

²⁴⁰ The basis of attribution was the arrondissement which is smaller than the Belgian province. The Belgian province is roughly equivalent in area to the French department or the English county.

²⁴¹ One was a recent PhD in business economics, a second a teaching assistant with a master's degree in business economics and the third an undergraduate in an unrelated discipline. Using an indicator of similarity of the responses of the different coders compared to the average, a high degree of consistency was found in coding by the different coders. As a result a simple average of the responses was used for the values of the different variables.

semantic differentials scales is potentially problematic because they are not continuous variables. Instead they are generally considered to be ordinal and their distribution tends to be non-normal, which poses a problem for maximum likelihood factor analysis. The asymptotic distribution free method does not require multivariate normality and so was preferred to maximum likelihood estimation.

While each of the three dimensions of intangibility has three different indicators, only the search criteria in the S-E-C framework is being measured by three different indicators and while confirmatory factor analysis could be applied jointly to the different indicators for intangibility, only search could be analysed using a single factor. In subsequent analysis the three dimensions of intangibility and the search criteria are measured using the factor scores from the confirmatory factor analysis while for the experience and credence variables only the coding of the relevant questions could be used. The basic structure of the two confirmatory factor analysis along with the standardised values of the coefficients and error terms (**p<.001) are set out in the path diagrams below.

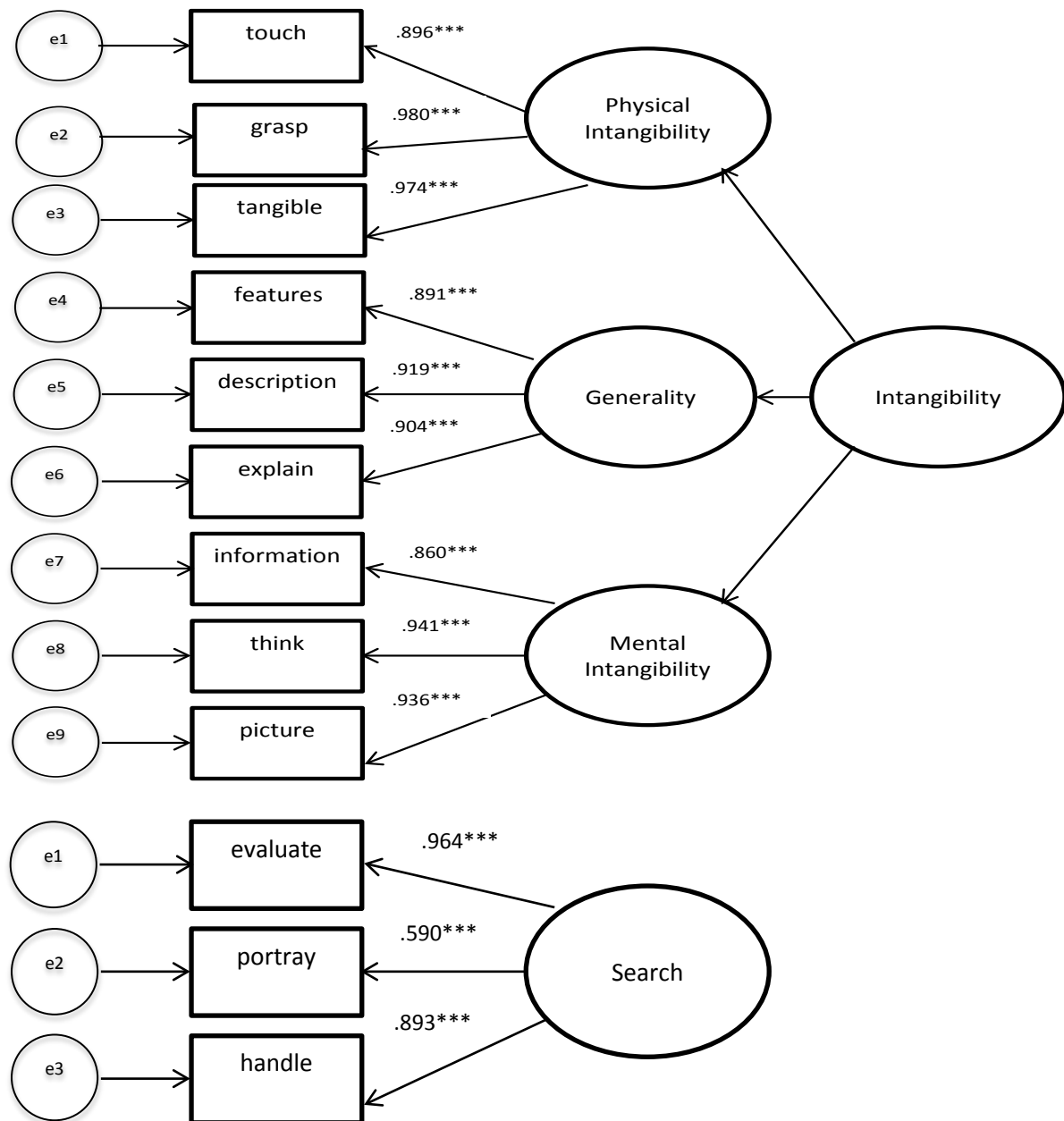


Figure 1. Confirmatory Factor Analysis.

Each of the indicators loads strongly and positively on the relevant construct. Only the indicator portray among the search indicators has a somewhat weaker coefficient. Goodness of fit can only be measured for the intangibility model. In terms of the standard criteria for goodness of fit, four are within minimum accepted levels (Chi-square/df<3, p value >.05, Comparative Fit Index (CFI)>.90, Root Mean Square Error of Approximation (RMSEA) between .05 and .10) while the value of one, the Standardized Root Mean Square Residual (SRMR), is clearly outside the accepted range (>0.9). Overall goodness of fit can be considered as acceptable.

Reliability of the results of the factor analysis was confirmed with a Composite Reliability indicator (CR) above 0.7 and convergent validity with both a CR above Average Variance Extracted (AVE) and a value of AVE above 0.5. Finally, a value of Average Shared Variance (ASV) lower than AVE was used to establish discriminant validity (Table 3). Mental intangibility and generality shared the highest variance without compromising discriminant validity while physical intangibility and search also share some common variance.

Table 3. Validity and Reliability.

Variable	CR	AVE	ASV	ASV	ASV
			Physical Intangibility	Generality	Mental Intangibility
Physical Intangibility	0.964868	0.901663			
Generality	0.931271	0.818755	0.270088		
Mental Intangibility	0.937597	0.727362	0.33074	0.668633	
Search	0.866251	0.691737	0.625523	0.20286	0.209489

Since the need for proximity between provider and customer has been identified as an important influence on trade, it was necessary to add a variable that captures this aspect. When physical proximity is required either the customer must move to the supplier (mode 2 under the GATS) or the supplier must move to the customer (mode 4 under the GATS). For certain services for which either the necessity to move is inherent in the service (construction services must be supplied in situ) or where it is the overwhelmingly dominant way to provide a service (the customer moving physically to the provider in the case of travel), a simple identification of the mode by which the service is supplied should be sufficient to take in the proximity requirement.

However certain services can be supplied in multiple ways and this creates a problem of identification because the data on cross-border trade do not distinguish between the different modes. As indicated previously physical proximity is not always required for interaction to occur and physical proximity is becoming less and less necessary for certain services so that any identification of modes 2 and 4 is likely to change over time. Based on work in the World Trade Organisation (WTO) an identification was made of the principle mode by which different services are traded at that point in time (WTO, 2008; 2009). A dummy variable was then created taking the value of one for services for which the principle mode requires either the supplier or the customer to move physically across a border.

After testing the results of regressing trade on these characteristics with cross-section data for three different years, few differences in the results were found over time. To simplify the presentation of results, pooled OLS regressions were run on the panel data of Belgian enterprises over the years 1997 to 2005 (details of the data are provided in the next section). Because in a pooled regression there is considerable continuity in trade for each enterprise, robust standard errors were clustered at the firm level.

The general form of the structural model to be estimated is as follows:

$$\ln(\text{trade}) = \beta_0 + \beta_1 \text{service characteristics} + \beta_2 \text{firm characteristics} + \beta_3 \text{sector} + \beta_4 \text{related trade} + \beta_5 \text{time dummies} + \varepsilon$$

The dependent variable **trade** takes on one of three values: cross-border trade (exports or imports), sales of foreign affiliates and share of cross-border in total trade. Trade for the 24 categories of services and 97 categories of goods is the value of trade world-wide per firm measured in euros. The first two variables are expressed in logs, while share is a percentage. They are measured separately for exports or sales of foreign affiliates of Belgian companies and for imports and sales of affiliates of foreign firms in Belgium. Thus there are in all six different dependent variables. In addition the regressions are run separately for trade in services and trade in goods making twelve different types of trade regression. Because the emphasis is on measuring the effect of individual characteristics of services and goods, for firms that trade in more than one product there can be multiple observations for the same year. The unit of observation is therefore *Firm*Year*Category* (good or service).

The set of **service characteristics** is composed of the variables relating to characteristics of services and also goods. They include the factor scores for physical and mental intangibility, generality and search with the responses to the individual questions for the experience and credence variables plus for services only the dummy variable for mode of supply of the service.

The set of **firm characteristics** is composed of a dummy variable for whether the firm is situated immediately on the border with a neighbouring country (*border*) plus a number of control variables relating to the individual firm. The log of turnover (value added for sales of affiliates of foreign firms in Belgium) is a size variable which is always present along with the log of the date of creation of the firm (*age*). Other similar variables which vary according to the

regression specification relate to the log of labour costs, the log of labour productivity, profitability and the markup, included as a control variable for the level of competition.

The set of variables related to **sector** is composed of a series of dummy variables of the sector of activity of the firm. In the simple specification this is limited to dummies for manufacturing and services (the reference group is composed of firms categorised as either in agriculture and extractive industries or non-market services). In the extended specification, dummies are included for individual types of services or, in the case of goods, for manufacturing at the two digit NACE level.

The set of **related trade** variables covers a series of associated trade variables for each firm which also vary with the regression specification but are always present in the relevant form. This allows to control for complementarity or substitution between different forms of trade. Trade variables cover the log of the value of complementary trade of the same service or good either cross-border or through foreign affiliates. The extent to which service traders also trade goods or goods traders also trade services is controlled for by the log of the total value of imports and exports of goods or services.

The set of **time dummies** controls for developments over time in the dependent variable and ε is an error term.

5 The data

Panel data on individual firms for the period 1997 to 2005 held by the National Bank of Belgium is drawn from five different sets linked by the basic business repertoire. One data set holds balance sheet data, another holds data on cross-border trade in services, another on cross-border trade in goods, one on outwards foreign direct investment and the fifth on inwards foreign direct investment. From these different data sets the relevant variables identified in the previous section are extracted and combined.

All firms in Belgium with a limited liability legal form are obliged to file balance sheet data with the National Bank of Belgium (NBB). Most economically active firms in Belgium choose to incorporate in order to benefit from limited liability. The exception are some of the self-employed who may choose to incorporate or not. The balance sheet data used here does not cover the financial sector for which a different type of balance sheet is used. Small firms are only obliged to file limited balance sheet data, while large firms must file an extended version. Since most firms in services are small, only items available in the short version of the balance sheet were selected. A few firms that export or import are not present in the balance sheet data and these have been dropped from the data set.

There are two major problems with the balance sheet data. Small firms are not required to file data on turnover in their balance sheets. In fact only 40% did so in 1997 declining to 25% in 2005. Since turnover is the variable required to calculate various indices for the study, it was imperative to solve this problem by combining data from the VAT authorities with that from the National Bank. In this way it was possible to achieve an overall coverage of turnover of 84.2% of all firms for which there is balance sheet data. These firms however represent 97.5% of value added, 98.4% of employees, 99.1% of imports of services, 98.7% of exports of services and all imports and exports of goods. The economic representativity of the data is therefore very high.

The second major problem encountered is that only employees are covered in the balance sheet data while 52% of all firms in the NBB balance sheet data had no employees, which falls to 48% if only those firms for which there is data on turnover are considered. On the one hand this makes the coverage of the data very interesting because it covers service firms that are excluded in most data sets, including micro enterprises. On the other hand the absence of any employment data for these firms makes any calculation of labour productivity problematic because we lack a suitable denominator. In practice, productivity can only be calculated realistically for those firms with twenty or more employees, since below this threshold the figures are quite biased by the self-employed. Even the proxy of labour cost is only available for those firms with one or more employee. Because labour costs enter into the calculation of the markup, this variable is also only available for those firms with employees²⁴². Including only those firms with one or more employee reduces the number of observations for exports of services by 16% and by 62% if only those with twenty or more employees are included. The equivalent figures for foreign affiliates of Belgian firms are 11% and 42%. Small and even micro firms with no employees therefore do engage in trade and it is worth including them in any analysis.

Another important issue concerns the coverage of the data on cross-border trade in services. Data on cross-border trade in services is collected by the National Bank of Belgium as part of the statistics on balance of payments. They are the source for data published nationally and also by Eurostat as well as those published by international organisations such as the OECD and the IMF. During the period covered here, financial intermediaries had to report payments made or received by their clients when the payer or the payee was a non-resident. This source of information was completed by returns from some direct reporters (i.e. big companies). Thresholds for reporting increased in 2002 creating a small break in series. More serious is the fact that it has not proved possible to attribute the items covered under "travel" to individual enterprises in Belgium. The NBB data also excludes data on merchanting from their data base on trade in services since it is considered to be part of the trade in goods. For those services for which it was possible to attribute the EBOPS post to an individual enterprise, coverage compared to the total trade reported by Eurostat for Belgium in

²⁴² The markup is measured by an approximation of the Lerner Index as: $markup = \frac{turnover}{labourcost+capitalcosts}$ (Griffith; Harrison, 2004)

2005 varies considerably (Fig. 2). In the case of computer services the value of individual firm data even exceeds the reported ones. For fifteen of the twenty-four services the total value of both imports and exports at firm level represents more than 60% of the total reported.

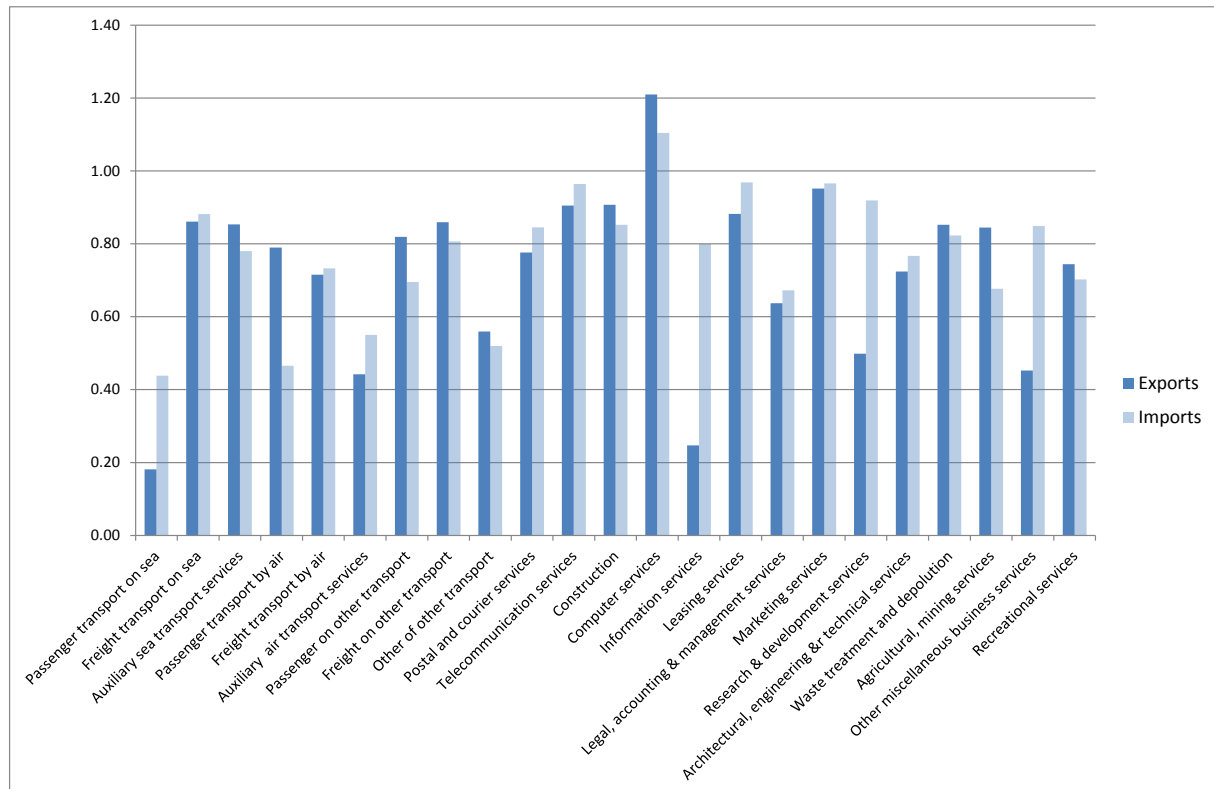


Figure 2. Coverage of NBB data on trade in services.

Issues relating to cross-border trade in goods are different in nature. Most trade in goods can be attributed to an individual enterprise. However, so called “carry along” trade comprises a large share of Belgian trade in goods. Goods enter the country and leave without transformation in the Belgian economy. It is not possible from the data used for this paper to distinguish trade in goods destined for the Belgian economy from that which is through trade. A second major issue concerns the thresholds for reporting and the effect of the 2004 enlargement of the EU. Thresholds for reporting changed more frequently and more significantly for goods than for services. For third countries data is collected at the frontier but for intra-EU trade it is collected via surveys of enterprise with a higher threshold. The result is that on enlargement trade that was previously registered is no longer unless the new threshold is exceeded. Overall therefore the trade in services data is much more stable over time than that in goods but coverage is lower and varies from service to service.

Cross-border trade by firms in the goods and services sectors displays some interesting differences. Goods are traded either by the manufacturing sector or by the distribution sector which accounted for a third of exports and over half of imports in 2005 (Table 4). While exports of services are concentrated in firms in the transport, information and communication and professional and scientific sectors, imports of services are traded much more widely in conformity with their role as key inputs to the economy as a whole. Thus shares of imports are lower than exports for the major service exporting sectors and manufacturing and distribution become major importers as well as non-negligible exporters. At a more detailed level it is possible to identify courier services, computer services, architectural and engineering services, services to agriculture and industry, waste management, other business services and leasing as ones for which the majority of exports are provided by firms whose main activity is outside that of the service being provided. This ability to track cross-border trade in services irrespective of the principal activity of the firm doing the trading is an important advantage of the data set.

Table 4. Cross-border trade by sector of activity, 2005.

<i>Sector of Activity</i>	<i>Total Exports of Services</i>	<i>Total Imports of Services</i>	<i>Total Exports of Goods</i>	<i>Total Imports of Goods</i>
Manufacturing	6.0%	17.9%	65.2%	44.9%
Utilities	0.8%	0.8%	0.0%	0.1%
Construction	4.1%	1.6%	0.2%	0.5%
Distribution	3.9%	10.0%	32.8%	51.2%
HORECA	0.1%	0.2%	0.0%	0.0%
Transport	41.6%	34.1%	0.2%	0.7%
Information & Communication	10.7%	9.0%	0.1%	0.5%
Real Estate	0.3%	0.2%	0.0%	0.0%
Leasing	0.7%	0.5%	0.1%	0.2%
Professional & scientific	19.6%	15.8%	1.1%	1.3%
Administrative services	2.1%	0.9%	0.1%	0.1%
Waste management	0.2%	0.1%	0.0%	0.0%
Audiovisual & recreational	1.5%	1.7%	0.0%	0.0%
Other	8.3%	7.2%	0.1%	0.3%
Total	100.0%	100.0%	100.0%	100.0%

Unfortunately, this advantage does not carry over to the data on foreign direct investment. The data on outward foreign direct investment contains data on the foreign turnover of affiliates of Belgian firms and by matching the data on inward foreign direct investment with that of the balance sheet it is also possible to establish the turnover of affiliates of foreign firms in Belgium. However in both cases there is no breakdown of turnover by type of service or good so that this data cannot be directly matched with that on cross-border trade. The FDI data codes commercial presence by the principal NACE activity of the affiliate. Correspondence tables from Eurostat then permit to match the principal activity with one of the categories of EBOPS for services or CN2 for goods. Attributing all of the turnover of the affiliate to one category of cross-border trade is implicit in this procedure, which on the basis of the data in Table 4 is unlikely to be the case. No work around for this problem exists. The value of the procedure lies in the ability to produce a coherent set of data covering the different forms of trade in services at a disaggregated level.

6 Results

The main results of the pooled OLS regressions are set out in Table 5 for trade in services and in Table 6 for trade in goods. For reasons of space, year dummies have been omitted from the tables as well as other control variables from panel two. Since this paper looks at the structural effect of characteristics on trade, developments over time have not been examined. Overall trade in both goods and services has been increasing but particularly for goods changes in thresholds make time series analysis problematic. Likert and Semantic Differential scales are ordinal and not cardinal making the values of the coefficients of limited usefulness. Only the sign and the significance of the coefficients will be considered here.

Physical tangibility (Tangibility) strongly promotes both exports and imports of services. While the sign for both outward and inward FDI are negative and that for the share of cross-border trade positive as expected none of them are significant. H1a is therefore strongly supported while H1b and H1c are at best weakly supported.

Generality was expected to exert a positive influence on cross-border trade but for both exports and imports the results are significant and negative. They are also negative without being significant for sales of foreign affiliates and positive and significant for the share of cross-border trade in total sales. It would seem that the positive impact of this construct is exercised therefore on the way a service is traded rather than the amount of trade, rejecting hypotheses H2a,b and c.

Mental intangibility (Conceptibility) reduces both exports and imports of services highly significantly as expected. Instead of promoting sales by foreign affiliates, it reduces them, although the coefficient is only significant for inward FDI. Equally mental intangibility tends to promote cross-border provision in the place of a permanent presence. Thus while H3a is strongly supported, both H3b and H3c are rejected. It appears that the difficulty to grasp the nature of a service depresses both cross-border trade and sales of foreign affiliates so that permanent presence does not reassure customers more than when they purchase directly from a supplier located in a different country.

As expected, a positive value on search characteristics increases both imports and exports highly significantly, thereby supporting H4a. The generally non-significant and differently signed impact on sales of foreign affiliates between outward and inward FDI tends weakly to support the indeterminacy of H4b. Since the choice of cross-border trade over permanent presence varies significantly between outward and inward trade, H4c cannot be supported.

On the basis of the literature review, the effect of the experience and credence variables could be expected to be at least as strong as those for search characteristics but this does not prove to be the case. Because of the way that experience and credence variables have been coded, coefficients on these variables should be positive to support hypothesis H5a and H6a that these characteristics depress cross-border trade. Instead we find that coefficients on the experience criteria for both exports and imports of services are non-significant but negative so that services that are difficult to know without experiencing it are more likely to be traded cross-border than those that are easy to know without experiencing it. Hypotheses H5b and c expect indeterminacy of the impact of the experience criteria on the amount of sales of foreign affiliates or the choice of one mode of trade over the other. Instead, the experience variable affects significantly the choice of mode in the direction that services that are difficult to know without experiencing it are more likely to be traded cross-border, contrary to expectation. Thus neither hypothesis H5a nor hypothesis H5c are supported.

The credence characteristic impacts exports and imports of services highly significantly but in opposing directions. Credence actually promotes exports of services while it depresses imports. Coefficients for the sales by foreign affiliates are not significant and with different signs for outward and inward FDI. Contrary to expectation the credence variable promotes a higher share of cross-border in total trade for both exports and imports, significantly so for imports but not for exports. Therefore we have support for H6a only for imports, indeterminacy for H6b instead of a positive impact and no support for H6c.

Overall the impact of the search-experience-credence framework is much less strong than would be expected from the literature. It goes rather in supporting the findings for the tangibility construct since the search characteristic is most strongly related to physical tangibility.

The proximity variable (mode) reduces exports of services highly significantly as expected and also depresses the share of both exports and imports in total trade. The effect on sales of foreign affiliates is non-significant for both outward and inward foreign direct investment but signed differently. The biggest surprise comes from the positive and highly significant value of the coefficient for imports. Imports of professional services, which usually require some interaction between supplier and customer, are relatively more important than for exports and this may help to explain the result. Hypothesis H7a is supported only for exports, while H7b is not supported and only H7c strongly supported.

The impact of a border location is to promote exports but depress imports, to depress sales of foreign affiliates and promote a higher share of exports and imports. The negative impact on imports of services can perhaps be explained by the fact that many very large firms, including holding companies that are major traders in services, are situated in Brussels. Hypothesis H8a can therefore only be supported for exports, while H8b has only weak support contrary to stronger support for H8c.

In conclusion, service characteristics related to tangibility exercise a particularly strong influence on exports and imports, while characteristics relating to search-experience-credence, proximity and border location particularly affect the choice of type of entry mode for trade. Service characteristics seldom affect the value of sales by affiliates.

Larger firms trade more both cross-border and through foreign affiliates and because it requires more resources to enter through commercial presence, smaller firms prefer to trade cross-border rather than through foreign affiliates. Younger firms tend to trade more cross-border (the log of date of establishment of the firm is positive), but age does not have a significant effect on sales of foreign affiliates.

Both exports and imports follow a similar pattern with regards to the corresponding complementary forms of trade. Exporters of services import the same service very significantly and vice versa. There is also a strong relationship between sales of foreign affiliates and cross-border trade both outwards and inwards, indicating complementarity rather than substitution between the two forms. The coefficients on the value of exports and imports of goods are in both cases close to zero. These complementarities are not significant for the sales of the foreign affiliates of Belgian firms. The affiliates of foreign companies in Belgium also import significant amounts of the same service and are very active importers and exporters of goods. When it is remembered that foreign firms are strongly present in the distribution sector, which accounts for more than half of imports of goods and a third of exports, this result becomes less surprising.

The effect of the markup is to depress both exports and imports of services, indicating that firms which operate in less competitive markets have less incentive to trade cross-border. The effect on sales of foreign affiliates by Belgian companies is negative but not significant while that on sales of foreign companies in Belgium is both positive and highly significant. Lack of competition on the Belgian market therefore attracts foreign investors.

Coding the characteristics of goods in the same way as services can help to establish the extent to which trade depends on characteristics that are common to both and to highlight differences between the way in which goods are traded from those of services (Table 7). Since goods are much more homogeneous than services, differences in characteristics for goods are less than those for services so we should expect a weaker impact on trade. The effect of physical tangibility, generality and mental intangibility on imports and exports of goods is also highly significant and in the same direction as for services. Contrary to services, the search variable is not significant for either imports or exports of goods and signed differently for exports than for imports, while the experience and credence variables are in the same direction as for services, but more significant in the case of experience. A border location stimulates exports of

goods but depresses imports just as for services. Of note also the lack of importance of the characteristics of goods on sales of foreign affiliates, similar to services. Overall therefore the results for goods support those for services with partial exception of the search construct.

Table 5. Regression Results for Trade in Services.

Services						
Variable	Outward			Inward		
	Exports	Sales of foreign affiliates	Share of Exports in Total Sales	Imports	Sales of Affiliates of Foreign Firms	Share of Imports in Total Sales
Tangibility	0.1797***	-0.0398	0.0027	0.5034***	-0.0438	0.0036
Generality	-0.2242***	-0.9329	0.0285***	-0.7017***	-0.6347	0.0189***
Conceptibility	-0.2394***	-0.7143	0.0165***	-0.3691***	-0.7492*	0.0165***
Search	0.1127**	0.4106	-0.0128***	0.5088***	-0.1484	0.0087**
experience	-0.0083	-0.0307	-0.0096***	-0.0284	0.3367***	-0.022***
credence	-0.0669***	0.0448	-0.0008	0.1008***	-0.0215	-0.0026*
mode	-0.3371***	-0.0412	-0.0264***	0.4707***	0.1745	-0.040***
border	0.0738*	-0.509**	0.0055*	-0.2299***	-0.13	0.0095***
turnover	0.1787***	0.1363**	-0.0072***	0.2373***	0.6961***	-0.006***
age	10.6828***	10.3265	1.4901***	9.5740***	4.6539	0.2853
manufacturing	-1.2055***	0.1432	0.0544***	-0.9717***	0.2169	0.0273***
services	0.1312	-0.1351	0.0366**	-0.3205***	0.5104*	-0.0062
impserv	0.0990***	0.003			0.0387***	
expserv		0.018		0.1220***	-0.0014	
totgimport	-0.0000**	0.0081		0.0000***	0.0482***	
totgexport	0	0.0112		-0.0000*	0.0425***	
FATSin	0.0659***	0.0025		0.0448***		
FATSout	0.0915***			0.0585***	-0.0012	
servin			0.0032***			
servout						-0.0002
(Year dummies)						
constant	-71.4126**	-64.1066	-10.2543***	-64.317***	-31.3657	-1.0266
N	73700	1887	75514	85654	2156	82523
r2	0.2006	0.0907	0.0394	0.2124	0.7046	0.0362
Tangibility	0.3628***	0.2178	-0.0019	0.5927***	0.0152	0.0070**
Generality	-0.1152	-1.4525**	0.0294***	-0.5927***	-0.7107*	0.0135***
Conceptibility	-0.114	-1.0504**	0.0158**	-0.2551***	-0.7426*	0.0177***
Search	0.1027	0.8013***	-0.0204**	0.5497***	0.0261	0.0161***
experience	0.02	0.0492	-0.0103*	-0.0118	0.2238***	-0.026***
credence	-0.1659***	0.0158	0.0015	0.0741***	0.0479	0.0005
mode	-0.6351***	0.1086	-0.0271**	0.5167***	0.2068	-0.031***
border	0.1994**	-0.5677**	0.0023	-0.1160*	-0.0689	0.0057
markup	-0.0106***	-0.0182	0.0009**	-0.0077***	0.0312***	-0.0001
labcost	0.2024	0.3242	0.0031	0.6705***	0.2784	0.0116
profitability	-0.4846*	-2.6542*	0.0525***	-0.2699*	-0.4248	0.0098
productivity	0.0196	0.3186	-0.0112	-0.0625	-0.400***	0.0004
(control variables)						
constant	-119.70***	-37.3098	-8.0836**	-100.22***	7.5884	1.1616
N	28199	1090	29229	48765	1401	49684
r2	0.1954	0.2167	0.059	0.2563	0.8231	0.0343

legend: * p<.05; ** p<.01; *** p<.001

Table 6. Regression Results for Trade in Goods.

Goods

Outward				Inward		
Variable	Exports	Sales of foreign affiliates	Share of Exports in Total Sales	Imports	Sales of Affiliates of Foreign Firms	Share of Imports in Total Sales
Tangibility	0.2838***	-0.1139	0.0017	0.2388***	0.1315	0.0008
Generality	-0.1376***	0.2632	0.0002	-0.257***	0.1063	0.0003
Conceptibility	-0.1903***	0.2106	0.0011	-0.186***	0.1272	0.0011***
Search	0.0192	0.0003	0.0013	-0.0229	-0.1098	0.0002
experience	-0.3957***	-0.0245	0.0002	-0.248***	0.0644	0.0002
credence	-0.0534***	-0.0115	-0.0007	0.0905***	0.0201	-0.0002
border	0.0174	-0.1057	0.0006	-0.142***	-0.1303	0.0008*
turnover	0.0361***	0.4971***	-0.0022***	0.1896***	0.9465***	-0.001***
age	25.5368***	-9.1035	0.3501***	6.4783***	-4.957	0.0365
manufacturing	-0.2524**	-1.797***	0.0002	0.1037	0.6849**	0.0002
services2	-0.6240***	-0.9001	0.0074**	-0.0739	-0.0912	0.0021
distribution	-0.8968***	-1.940***	0.0117***	0.1194*	1.1943***	0.0044**
impgoods	0.1671***	-0.0079			-0.0089	
expgoods		0.0155		0.2367***	0.0446***	
servimp	-0.002	0.0131		0.0173	0.0137**	
servexp	0.0145	-0.0118		-0.0299*	0.0099	
FATSin	0.1331***	-0.0028		0.0670***		
FATSout	0.1626***			0.0574***	0.0035	
goodsin			-0.0002***			
goodsout						-0.001***
(year dummies)						
constant	-183.50***	78.5869	-1.6311**	-43.11***	38.8001	0.7348**
N	789181	6272	790456	1578522	5386	1542998
r2	0.149	0.2218	0.0159	0.2057	0.8071	0.0127
Tangibility	0.1712***	0.0627	0.0007	-0.0828**	0.1976*	0.0009
Generality	-0.182***	0.1512	0.0017	-0.295***	0.0514	0.0005
Conceptibility	-0.161***	0.115	0.0026*	-0.209***	0.0721	0.0021***
Search	0.1183***	0.0127	0.0025	0.0974***	-0.1554**	0.0005
experience	-0.355***	-0.0554	0.0008	-0.249***	0.0482	0.0006
credence	0.0348	-0.1152	-0.001	0.1182***	-0.0026	-0.0002
border	-0.0158	-0.0962	-0.0002	-0.0799**	-0.1303**	0.0002
markup	0.0132**	-0.03***	0.0003***	0.0005	0.0542***	0.0001
labcost	-0.2188*	0.2121	-0.004	-0.479***	0.6994***	-0.011***
profitability	-1.174***	-2.1853*	0.0092*	-0.04	-0.3136	0
productivity	0.5800***	0.4787*	-0.0026	0.0913*	-0.479***	0.0015
(control variables)						
constant	-85.49***	30.2554	-1.855*	-27.634**	31.0001	0.9198*
N	366554	5810	367492	745633	4867	747132
r2	0.2173	0.2929	0.0196	0.2549	0.8629	0.0198

legend: * p<.05; ** p<.01; *** p<.001

7 Policy Implications

Service characteristics affect the tradability of services. Tradability is important because it conditions the possibilities for market integration within and outside Europe and market integration is expected to lead to more competition. Service characteristics should therefore have implications for policy development. Service characteristics are not immutable and change under the impact of technology. As a result, forward looking policy on market integration needs

to take into consideration the dynamics that are unleashed by technology which provide new opportunities for trade but may make the current regulatory structure ill-adapted, out-of-date or redundant.

While we have good theoretical foundations for the relationship between technology and market structure for goods (Sutton, 1998; Scherer, 2000), the same cannot be said for services, and even less for the relationship between technology and trade in services (Miozzi; Soete, 2001). Both the way and the degree to which technology modifies service characteristics appears to vary with the construct. Tangibility, both physical and mental, appears one area where there is at least potential for making services more tangible. Clearly technology is modifying the burden of proximity by promoting interaction of persons at a distance (Skype) or even abolishing it altogether where a service can be provided without interaction at all (on-line banking as opposed to a visit to the local branch). It is less clear how technology modifies the need to experience a service or the credence characteristic. As we have seen, the latter can be modified by credible forms of commitment on behalf of suppliers, forms which however have little to do with technology choices.

Miozzi and Soete remark that technological transformations have eroded barriers between industries, resulting, in some areas, in pressures for deregulation. Further the extent to which firms are allowed to enter markets depends on the extent to which domestic regulation constraints can be relaxed. The nub of the problem therefore concerns the fit between current regulatory structures and changing possibilities to offer services, particularly the possibility to offer services cross-border.

These issues are currently brought to the fore by the proliferation of internet applications such as Uber or Lyft for car sharing and Airbnb for room rentals. These applications represent disruptive technology for established providers such as licensed taxis and hotels. Both of these industries are currently regulated in such a way as to create barriers to entry. Through bypassing these regulations the new entrants provide more choice to consumers and erode the rents that the traditional providers have been able to build up on the basis of entry barriers. They therefore have the potential to substantially increase consumer welfare²⁴³. Not surprisingly reaction by incumbents has been furious everywhere with protests by taxi drivers in London, Paris, Milan Berlin and a ban on the supply of such services in Brussels.

The substantially new way in which these services operate is by using the Internet to create a cross-border service from one that was previously very local. It can credibly overcome the information asymmetry between supplier and customer by its capacity first to control the quality of supply. Second the possibilities of feedback to the application firm allow that firm on an independent basis to filter both suppliers and clients. Both bad suppliers and bad customers can be eliminated from the system in such a way as to improve the overall quality of the service. This is a much more powerful tool than usual customer complaints procedures either direct to the supplier or to some third party such as a consumer organisation or public complaints procedure.

Because the services supplied over the Internet with the help of sharing applications are cross-border, it should provide a justification for intervention by a supra-national body such as the European Commission which has the mission to build a Single Market for services. Up until now efforts to liberalise local taxi services have largely foundered on the protests of incumbents. This applies equally to national initiatives such as the Attali report in France (Attali, 2008) or the 2012 Monti decree in Italy and to those mandated by international institutions as a condition for the Greek bailout. It applies in general to structural reforms in Member States regularly recommended under the Lisbon and follow up Europe 2020 programmes. Clearly local regulation to ban or restrict vehicle or room rental services undermines the proper functioning of the internal market for services and presents a test of the willingness of the European Commission to effectively force these markets to open up to competition.

The lack of clear evidence that experience or credence characteristics of services are limiting cross-border purchases of services combined with the new possibilities opened up by technology for controlling quality of services supplied via the Internet would seem to indicate that market solutions to problems of asymmetric information are working better than expected. Since the characteristics of services have served as a prime reason for regulation to protect consumers it is time to review existing regulation of services with regard to who is being protected against which risk by which means. The possibility that market solutions may work better than public regulation in meeting the objectives of regulation should be acknowledged and, where appropriate, acted upon. This should not be taken as a plea for systematic deregulation of services but of a proper calibration of the objectives of public regulation with needs in the context of a rapidly changing environment for the provision of services cross-border.

8 Conclusions and future work

This paper has demonstrated an association between several but not all types of characteristics of services with regard to cross-border trade and the choice of entry mode for the provision of services internationally. On the contrary, sales based on a permanent presence seem to be little affected by service specific characteristics. Most of these findings also apply to trade in goods indicating that we are dealing with inherent characteristics that are not specific to services.

While the main findings with regard to characteristics of service remain valid after controlling for the degree of competition on the domestic market, we cannot be sure that certain characteristics of services are not themselves the cause of a lack of competition on domestic markets. This carries over in particular with regard to regulation, which can

²⁴³ In Ireland, specifically Dublin, starting in 2000 any suitably qualified person could obtain a license, which led to a significant reduction in waiting times for a taxi, from 11.5 minutes in 1997 to 6.2 minutes in 2008, resulting in an estimated value of time savings of more than \$400 million annually for Irish consumers.

affect both entry and conduct on the markets for services, and which is often justified by the need to protect consumers because of the inherent characteristics of services. In order to explore this issue further, future work will concentrate on how regulation in the origin country (Belgium) and partner countries affects trade in services. Because regulation and characteristics are not independent, controlling for the effect of each individually requires that there are services with similar characteristics but different regulatory regimes (or vice versa). This would seem to be the case for example for management consultancy, which is a largely unregulated profession with similar characteristics to heavily regulated professions such as legal or accountancy services.

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An Exploration of the Applicability of Service Dominant Logic in Mental Healthcare:

A case study of Care Programme Approach documentation in a UK Learning Disability Trust.

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Recent literature has suggested that Service Dominant Logic (SDL) can usefully be applied to healthcare, but further refinement and empirical work is needed. In the UK, 'Care Programme Approach' (CPA) case management is an interesting object of study. A Networked Service Dominant Logic (NSDL) model is proposed and used as a practical starting template for a qualitative exploration of a series of 8 CPA case reviews within a UK Learning Disability healthcare provider. It was found that the NSDL perspective was useful in capturing the CPA review process and in making suggestions for service improvement. The need for more research to confirm findings and to further develop the applicability of the model is subsequently discussed.

Introduction

There has been a marked development in thinking in recent years about services, service innovation and service marketing (Moussa; Touzani, 2010; Ballantyne; Williams; Aitken, 2011b; Perks; Gruber; Edvardsson, 2012). These developments follow the emergence of Service Dominant Logic (SDL) as a potential theoretical paradigm, most closely associated with Vargo and Lusch (2004; 2007).

In proposing SDL, Vargo and Lusch argued exchange was all 'Service', where 'Service' is the application of knowledge and skills for benefit. The authors adopted 'Value Co-Creation', associated for example with Ramaswamy and Gouillart (2010), as the central part of exchange. Knowledge and skills from relevant sources were produced *with* customers in appropriate combinations to form 'operant resources' which can be integrated by customers to create value for themselves, and co-create value for other participants. 'Value' was deemed as experienced uniquely by the customer, with 'benefit' being potential source of value. It was implicit, and later confirmed by subsequent theorists (Ballantyne; Frow; Varey; Payne, 2011a), that the transaction could be viewed as having a reciprocal dimension: i.e. so long as the customer is able to create value, "the service provider should be able to create value for themselves" (Grönroos; Ravald, 2011). In this context, there has been a significant influence on traditional views of marketing (Olivia, 2012) and a shift in focus from transactions to relationships (Hadjikani; LaPlaca, 2013), which has subsequently been taken up in the B2B literature (cf. "it's all B2B...and beyond", Vargo; Lusch, 2011).

From the interplay with the B2B literature therefore it is now argued that SDL should be viewed as embedded in its relationship network context (Vargo; Lusch, 2007; Edvardsson; Tronvoll; Gruber, 2010). Interestingly, from there it has been a natural development to consider the applicability of SDL to public sector services (Vargo; Lusch, 2011; Hadjikani; LaPlaca, 2013; Hardyman; Daunt; Kitchener, 2014). Healthcare in particular has been proposed as a potentially useful field to consider (Alves, 2012; Radnor; Osbourne, 2013; McColl-Kennedy; Vargo; Dagger; Sweeney; Kasteren, 2012), although more empirical investigation is required. The need for further empirical work is a more general issue for the applicability of SDL in practice (Brown, 2007; Winklhofer; Palmer; Brodie, 2007; Baron; Harris, 2008; Korkman; Storbacka; Harald, 2010; Warnaby, 2011). In essence, the cardinal elements of service exchange emerging from the literature involve the interplay between 'the network context', 'operant resource', 'co-creation processes' and 'value'. It is proposed to label this embedded perspective as 'networked service dominant logic' (NSDL). Further empirical work is required to explore the application of 'NSDL' in practice.

Currently, there is criticism of the concept clarity (Grönroos; Volma, 2012) and practical real world applicability of the cardinal elements of SDL (Winklhofer *et al.*, 2007). As Korkman *et al.* (2010) state, there have been few attempts "to understand the actual practical process of resource integration, and how value stems from integration". Moreover, such efforts should focus on studying all the components of SDL in practice together (Winklhofer *et al.*, 2007). This is in contrast for example to Baron and Harris (2008) and Baron and Warnaby (2011) or McColl-Kennedy *et al.* (2012) who have empirically explored aspect of SDL such as operant resource and co-creation in isolation. Therefore, there is a shortfall in the service research literature to empirically explore the applicability of SDL in a network context, where all the cardinal elements are included. There is a further issue of extending empirical work, as appropriate, across a wide range of service sectors including the public sector.

Recognising the need for structured empirical work, Spohrer (2011) argues for an integration of SDL with a service science based approach and a supporting model had been proposed (Spohrer; Maglio, 2010). In practice, the model has not been widely adopted, and in a limited exploration of a public library system (Lyons; Tracy, 2013) the model did not represent the individual service user experience. Further, it might be argued that the model was over-complicated and the elements not so clearly distinct in practice. Nevertheless, the study does support the deployment of an ecologically

grounded framework for investigating service phenomenon applied to a defined entity in context. It is proposed that a simpler model that captures the cardinal elements of service dominant logic embedded in a network context would make a useful contribution to the investigation of service entities. A proposed model, 'the NSDL model', is set out below.

The Networked SDL Model (NSDL)

Derived from the foundational principles proposed by Vargo and Lusch (2004; 2007) in the context of a wider literature review (Spurrell, 2013), in keeping with the theoretical work of Grönroos (2008; 2011) and Grönroos and Ravald (2011), it is proposed that the cardinal elements for clarification in applying NSDL in the real world would be a practical understanding of 'operant resource', 'co-creation', 'value' and the nature of 'context' to the exchange. Drawing on the groundwork of the systems science perspective outlined above (Spohrer, 2011; Spohrer; Maglio, 2010; Lyons; Tracy, 2013) these elements acquire ecological integrity when combined in a suitable framework where care is taken to specify the entity of interest.

The NSDL model (Figure 1), it is proposed, captures these cardinal elements. It is proposed that the model would be applied to a defined service entity in context of a relationship network perspective. The model would provide a framework for mapping the inter-relationship between assembled operant resources, a platform whereby participants engage for the co-creation of value and the value changes represented as reported outcomes. The constituent elements need further explanation.

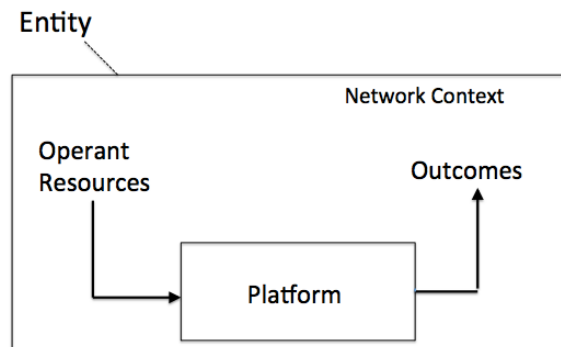


Figure 1. Diagram representing the elements of service dominant logic as applied to a service entity within a network: 'The NSDL model'.

The Entity:

It is envisaged that an object of study within the proposed NSDL approach would need to be a 'service entity', which can be defined as any service system or sub-system of interest which can be deemed as able to make and keep promises (Freund; Spohrer, 2013). This would be fundamental to drawing conclusions and inferences that have ecological viability within service systems.

The Network Context:

Some would argue that capturing the network perspective is too complex, and that continuing the conventional dyadic perspective of exchange is more practically useful (Winklhofer *et al.*, 2007). However, capturing the perspective of multiple actors is seen as crucial by others (Storbacka; Nenonen, 2011; Spencer; Cova, 2012). This tension is discussed by Zolkiewski; Turnbull (2002). In essence Zolkiewski and Turnbull recognised the need to study customer relations management theory in a network context. Based on earlier work in UK healthcare commissioning (Zolkiewski, 1999) they proposed a triad, applying a portfolio analysis to each of the perspectives as a means of capturing the network context. The advantage brought was the ability to model a practical focus on the contact between customer and supplier, whilst also being able to represent the perspective of other relevant 'indirect participants' (Figure 2). A more detailed perspective on triads has been provided by Vedel, Geersbro and Ritter (2012), and is consistent with adopting the Zolkiewski and Zolkiewski and Turnbull's structured triad approach. In Zolkiewski's (1999) model (Figure 2), the entity in question (focal organisation) is the service provider organisation, with a portfolio analysis framework applied to each of the perspectives of the customer network, supplier network and an 'indirect' network which captured other interested perspectives as regulatory bodies, government, competitors etc.. In conceptualising the NSDL model it is proposed to similarly adopt this triadic structure, though using the service theory lens to examine the participating network perspective. In terms of the nature of that lens, Vargo and Lusch (2011) advocate adopting Giddens's (1984) 'structuration' perspective for capturing service context.

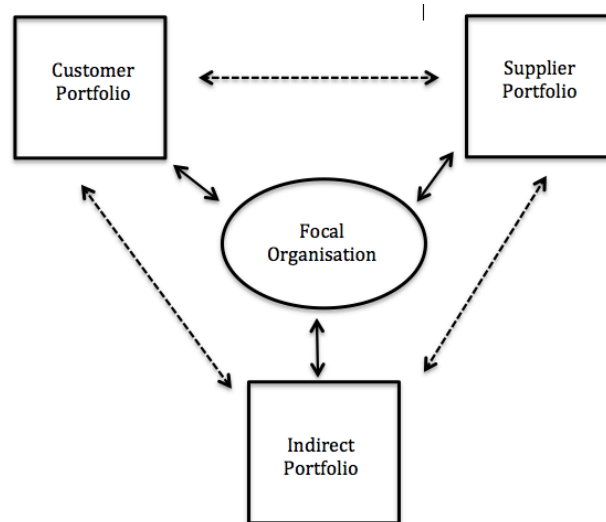


Figure 2. A Network Perspective of Portfolio Analysis. Reproduced and adapted from *Purchaser Provider Relationships in the UK National Health Service: A Marketing Perspective*. (Zolkiewski, 1999, p195).

Operant Resources:

‘Operant resources’ are defined in SDL as complex combinations of knowledge and skill made available by participants for integration in service exchange (Vargo; Lusch, 2004; 2007). ‘Operant Resources’ are distinguished from ‘Operand Resources’, which represent simpler, more fundamental resources such as raw materials. There are already a number of different views on Operant Resource within the literature. Ballantyne *et al* (2011a) studied the phenomenon of ‘practices’ (a kind of operant resource from the definition) as exhibited by both supplier and customer, for example. A similar perspective can be seen in work by Alter (2008). Meanwhile Freund and Spohrer (2013) point out that regulatory structures can act as complex, operant resources. Moreover, there is an untested assumption that all complex resource can be satisfactorily combined to form an adequate account of what is required for exchange to take place. The complexity as to what might be considered operant resource emerges in the Lyons and Tracy (2013) library study. Baron and Warnaby (2011) adopt a practical framework from Arnould, Price and Malsche (2006), which they had previously explored (Baron and Harris, 2008). The framework characterises ‘Physical Resources’ (including physical and emotional strengths), ‘Social Resources’ (including relationships and communities) and ‘Cultural Resources’ (including specialist technical knowledge and skills and historical qualities). It is proposed that pragmatically the Arnould, Price and Malsche (2006) framework should be adopted.

Co-creation Platform:

There has been perhaps less commentary on operant resource and rather more on Co-creation. Vargo and Lusch (2004) built on Ramaswamy and Gouillart (2010) earlier development of the concept of co-creation. Ramaswamy (2011), consistent with Vargo and Lusch (2008), considers value in terms of “human experience facilitated by networks”, but argues for the necessity of “an emergent platform” that bridges the gap from concepts to practice. Similarly, Grönroos (2011) explores the process of co-creation in some detail, presenting a two stage process of co-production of operant resource and a structuring between participants that enables exchange and value co-creation to occur. In fact, the idea of a platform or a structure between participants that captures exchange is widespread in the literature. Alter (2008) proposes such a model with his ‘Service Value Chain Framework’ and Glushko (2013) provides a brief overview and classification of available normative frameworks in service research before adding in a ‘naturalistic perspective’. Glushko’s point is that people naturally gravitate towards an instinctive ‘touch point’ topology when seeking to structure service processes, which can also be valid. Glushko supports a mixed approach to identifying supporting structures. In the context of co-creation therefore, the emergence of touch points that are seen as structuring the value co-creation process in a hybrid approach to structure are one way of capturing and characterising ‘co-creation’ in line with the Ramaswamy’s (2011) ‘emergent platform’ at the heart of exchange within Service Dominant Logic.

Value and Outcomes:

The notion of ‘value’ is clearly a key concept, and contributing to the ongoing debate as to the applicability of SDL in practice, Grönroos (2011) cites previous work to pronounce “Value for customers means that they, after having been assisted by the provision of resource or interactive process, are or feel better off than before” (Grönroos, 2008). For Edvardsson *et al* (2010) Value is a social construction, which therefore requires understanding as “in context”, though that does not contradict Grönroos (2011) definition. Notwithstanding the contextual relevance, however, there is a risk of confusion between what might be ‘value’ as externally apparent benefit: the “better off than before” defined by Grönroos (2011) and ‘value’ as a private experience. Therefore in contrast, Helkkula, Kelleher and Pihlstrom (2012)

are concerned with “the lived experience of value” as the core construct, emphasising the individual phenomenological dimension that Vargo and Lusch proposed. Similarly Hardyman *et al* (2014) for healthcare advocate detailed ethnographic exploration of the individual patient experience. However, this construction leaves ‘Value’ as somewhat inaccessible to the observer and lacks practicality for day to day management purposes. Spohrer and colleagues (Spohrer; Maglio, 2010; Spohrer, 2011) apply a systems science lens to the core concepts of SDL and in that context ‘Value’ is rather represented as ‘Outcome’, where outcomes are “value changes”. They propose that value change can be categorised as one of a range of win/lose outcome combinations for participants. Therefore, the notion of ‘value’ as ‘better off than before’ will be implicit in this model and will be encompassed by a study of ‘outcome’ for participants, where outcome would consist of categorical (‘winning’ or ‘not winning’) progress towards objectives valued by participants.

Positioning and integration of elements of the NSDL Model:

As noted above, Winklhofer *et al* (2007) make the point that the elements of SDL need to be investigated together, and that the practical applicability in the real world is key to the ongoing value of SDL (see also Brown, 2007). In this context, the proposed NSDL model integrates the cardinal elements of SDL in a practical format. In combining a number of elements it should be noted that the model is not intended to relate to ‘a general theory of the market’, or something such as per Vargo and Lusch (2011), although it retains their eco-system perspective. Möller (2013) examines the difficulties of combining theoretical perspectives in this field and argues for a more pragmatic approach rather than relying on a general integrating theory. The approach proposed is consistent with that taken by Zolkiewski and Turnbull in combining network context and customer relation theory (2002). Thus, the model combines ‘network’ as an “articulated contextual aspect” (Möller, 2013) with a structured form consistent with those proposed by for example Grönroos (2011). Therefore the model is not designed as a primary network analysis tool, but rather to explore “what are efficient forms of managing and organising value production in different contexts?” (Möller, 2013). It is proposed that empirical evidence of the practical usefulness of the model would be the means for its justification.

In summary, it is argued that further empirical work on the applicability of SDL in practice would be useful. It is proposed to adopt ‘NSDL’ as a term to represent the necessity for the application of SDL in a network context. There is space for a suitably configured model that captures the cardinal elements of NSDL and which is accessible to practical application in the investigation of a service entity. The NSDL model has been proposed as a pragmatic tool derived from the literature, though requiring further justification in terms of its empirical usefulness in a real world setting. It can be envisaged that an exploration of the NSDL model in practice could usefully form a first stage in a process of theory building as outlined by Christensen (2006), progressing subsequently perhaps to more normative investigation.

Health care

In terms of exploring an area of real world study, as indicated above there is a trend to see SDL as applicable to public sector services such as healthcare (Alves, 2012; Radnor; Osbourne, 2013; McColl Kennedy *et al.*, 2012). However, it is important to arrive not just at a sense of fit of theory, but also at a potential sense of impact for service improvement. In this context there is topical literature that reports a real difficulty with the status of mental health services within UK healthcare (Oyebode; Humphreys, 2011) as well as a lack of “parity of esteem” (Bailey, 2013) for mental health compared with other specialties. Mental health service ought to have a leadership advantage in fact with its traditional focus on patient centred complex case management, particularly in the Learning Disability sub-specialty. However, recent efforts to develop patient centred care models based on ideas such as ‘Recovery’ have been hampered by the difficulty with modeling such concepts in practice Meehan; King; Beavis; Robinson, 2008).

Since 1991 (and revised in 2008) it has been health policy in the UK for all patients with complex case management needs (including Learning Disability) to be managed through a case management system called ‘The Care Programme Approach’ (CPA). The position of CPA within case management approaches has previously been described (Simpson; Miller; Bowers, 2003a; Simpson; Miller; Bowers, 2003b). In principle CPA provides for a person centred process for the holistic assessment of complex patients, to integrate the necessary resources and to work collaboratively with patients, carers and stakeholders to best effect (Department of Health, 1990; 2008). Progress is reviewed through a series of ‘CPA review meetings’ held at intervals. The comprehensive coverage of CPA within UK mental healthcare makes it an ideal phenomenon to study for gaining insights into the configuration of care in mental health services. It would therefore be instructive to employ the NSDL model lens to explore complex case management within a UK Learning Disability service.

Case Study

The process of care within a UK Learning Disability Trust was selected as a convenient area for a first study of the applicability of the proposed NSDL model. The investigation sits within the theory building phase of research, as described by Christensen (2006), and a qualitative exploratory investigation was undertaken of themes derived from the NSDL model on a series of clinical case management reviews (known as ‘CPA’ reviews).

The selected Trust provides in-patient mental healthcare to patients with complex needs associated with Learning Disability and Autism and services are structured into four service areas that focus on the combination of learning

disability with the need for care in a medium secure setting, care in a low secure setting, a women's service and an 'enhanced care', or rehabilitation service. Patients within the services were all subject to the CPA care review approach and the Trust operates a protocol to describe the process of care, underpinned by patient centred values.

It is helpful to understand something more of how a patient CPA review meeting is configured in a network. The key participants in the CPA review process are the individual patient with their network of relatives and carers, and the clinical team. In addition, within the policy, there is an indirect stakeholder perspective included to provide for the accountability for example of the organisations responsible for commissioning service and the accountability of the provider NHS Trust for the regulatory perspective and the wider care system management. Thus, the network triad (Figure 2) adopted by Zolkiewski (1999) and Zoliewski and Turnbull (2002) provides a suitable template for describing network configuration, as discussed above. In Zolkiewski's model the 'focal organisation' (the service exchange in question) sits as an entity between the customer network portfolio of interests, the supplier portfolio of interests and a portfolio formed by the indirect stakeholders (for example regulators etc.).

Similarly, the CPA review meeting itself is an entity: an organisational structure which is able to make and keep promises (Freund; Spohrer, 2013). It is proposed that CPA sits (Figure 3) between the patient network perspective and the clinical team perspective with, similarly, a range of indirect interests to be engaged such as commissioners and regulators, as indicated below.

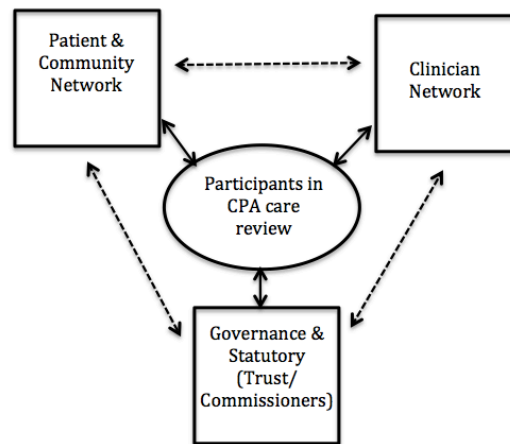


Figure 3. A triadic network perspective of stakeholder perspective applied to CPA review meetings in a mental health service, adapted from Zolkiewski, 1999, p195.

Local protocols may vary, but in this Trust a CPA review meeting is held usually at 6 monthly intervals over the course of an episode of care. At reviews progress reports are tabled, discussions take place and formal minutes taken and an agreed forward care plan issued. Therefore, each CPA review occurs in a very specific stakeholder context. The triadic network perspective, adapted from Zolkiewski (1999) is therefore a useful tool to be able to represent and position the CPA case review in its participant network context. As such a service entity, it is proposed that the individual patient CPA case review is a suitable unit of analysis for the application of the NSDL model.

In summary, it is proposed that the real test of the value of SDL in context is demonstration of its applicability in practice. Moreover, such testing should encompass all the various conceptual elements that go to form the process of service exchange as described in the literature. The aim of this case study is to explore the applicability of a proposed 'NSDL model' in a real world setting. Specifically, CPA case management reviews within a UK Learning Disability Trust provide an opportunity to explore the model's usefulness in capturing and representing service exchange. The ecological advantage of CPA as a phenomenon common across all UK complex mental healthcare further offers opportunities to identify areas for service and clinical practice improvement for consideration.

Method

Approval was obtained from the Trust Research Committee to undertake the study. No direct patient contact was required for the study and the investigation was structured as a service evaluation project and not a clinical study. All records remained confidential and no identifiable information was included. Within the case study literature it is quite legitimate for the focus of investigation to be a defined entity or phenomenon within an organisation, such as the CPA review (Yin, 2009; Woodside; Baxter, 2011). The project was conducted using a multiple case study design, where 'a case' was defined as an individual patient CPA review within one of the four service areas operated by the Trust: the medium secure service, the low secure service, the women's service and the enhanced care (rehabilitation) service. A systemic sample of cases was obtained by selecting two consecutive cases prospectively from the date of research approval being granted for each of the 4 service areas.

A CPA review takes place for each patient every 6 months at which reports are tabled and the attendance and the minutes of the meeting are recorded.

The data obtained for study consisted of all the relevant documentation filed in the electronic case record for the most recent CPA care review for the selected cases. The documentation in essence consisted of the minuted record of the CPA care review and any reports that may have been specifically tabled, typically professional progress reports for example. Some structured risk evaluations were included, as were in some cases the Health of the Nation Outcome Scale (Wing *et al.*, 1998) and 'the Recovery Star' (MacKeith; Burns, 2010). It was viewed that the designated CPA file constituted the official record. This was a study of documentation as distinct from oral information. In line with Atkinson and Coffey (2010, 80): "documentary materials should be considered as evidence in their own right". Further, they argue that the construction and conventions associated with documents, in this case these being the official record of the CPA review, are also part of the document's reality. Atkinson and Coffey (2010, 90) are clear in their view that the document in itself is not 'reality', rather that the interplay between selected documents provide 'a version of reality'. Therefore the study of the official CPA record is argued to be a valid basis for a study within an interpretive paradigm, supported by the between case triangulation of data to establish inter-textual consistency.

All cases were of adults of working age from within the North West Region of the UK, however as a service process study, apart from gender and service area, more specific demographic data on patients themselves was not included. The approach to data investigation was based on a thematic template analysis of the available documentation, as described by King (2012). As discussed above, the key themes suggested by the NSDL model were the networked context of the CPA review, where the CPA review forms the entity of interest, the assembling of operant resource, a platform to structure the engagement of participants in co-creation of value and valued outcomes. Therefore in the first instance, in keeping with the described methodology (King, 2012) the starting template was derived from the proposed NSDL model and an initial review of the data was undertaken. As a result, as permitted within this methodology, a further cross cutting theme of 'integration' was identified for inclusion in the template. This theme was to reflect the process of reconciling different perspectives within CPA case reviews. Meanwhile, in addition to providing a theme in its own right, the 'network perspective' was also structured as a cross cutting theme interacting with 'Operant Resource', 'Platform' and 'Outcome' respectively within the template. Consistent with the triadic network adapted from Zolkiewski (1999) as outlined above, the stakeholder network perspective was defined as being the patient network, the clinician perspective and the indirect perspective (representing commissioning, the Trust, regulatory oversight and other indirect stakeholders). Table 1 summarises the template and further outlines subthemes that indicate the criteria for assigning data to themes.

The data for each case was reviewed and a commentary was developed on the basis of the template. As an exploratory investigation data analysis was undertaken using pattern matching, consistent with the Cross-Case Synthesis approach to Case Study analysis described by Yin (2009, 156). Here, using between case triangulation, a picture was developed from the documentary data of the consistency and extent to which the NSDL model was able to represent the CPA care review process. Further, potential areas for improvement in service configuration were identified, as suggested through the lens of the NSDL perspective. The evaluation criteria consisted of:

- The elements of the CPA review meeting were plausibly and consistently captured by the NSDL model.
- The elements of the model lent themselves to practical general usage in understanding services.
- The NSDL model application showed consistency with previous theoretical and empirical research.
- The application of the model had the potential for impact on service improvement.
- The findings supported the possibility of progress towards a normative theory.

The implications for the applicability of an SDL networked model are discussed against the evaluation criteria outlined above.

Table 1. Template employed in the exploration of CPA case review documentation. Themes from the NSDL model with supporting references are indicated.

Template Theme	Nature of Evidence and Emergent Subthemes	Supporting Reference
Network <ul style="list-style-type: none"> • Patient Network Perspective • Clinical Team Perspective • Indirect Stakeholder Perspective 	<ul style="list-style-type: none"> – Personal attendance at Review – Unstructured contribution to discussion – Structured space on meeting agenda – View indirectly represented in documents – Direct production of documents 	Giddens (1984) Vargo and Lusch (2011)
Operant Resource <ul style="list-style-type: none"> • Patient Network Perspective • Clinical Team Perspective • Indirect Stakeholder Perspective 	<u>Physical and Emotional</u> Environment, attitude, engagement, motivation. <u>Social</u> Relationships, people, communities <u>Cultural</u> Specialist knowledge and skills	Arnould, Price and Malsche (2006)
Platform <ul style="list-style-type: none"> • Patient Network Perspective • Clinical Team Perspective • Indirect Stakeholder Perspective 	<ul style="list-style-type: none"> – Naturalistic touchpoints – Professional models – Service models – Regulatory structures – Other processes that structure participant interaction to a purpose 	Glushko (2013)
Outcomes <ul style="list-style-type: none"> • Patient Network Perspective • Clinical Team Perspective • Indirect Stakeholder Perspective 	<ul style="list-style-type: none"> – Categorical achievements (goal or objective met or not met) – Progress towards an identifiable goal or objective, either explicit or implicit 	Spohrer and Maglio (2010)
Integration	<ul style="list-style-type: none"> – Resolution of diverse perspectives within discourse 	N/A

Results

A sample of 8 cases of patient care planning meetings was obtained. The patients involved consisted of 5 men and 3 women, distributed across 6 Responsible Clinician Teams. All the meetings were held in 2013. The cases formed the basis for thematic template analysis, adopting the model developed from the literature as the starting template. The amount of documentation tabled varied from 1 item (the meeting minutes only) to 8 items, encompassing a range of professional and patient related documents. The key findings are reported below.

The applicability of the model to a clinical service

a) Network Perspectives

In all cases there was a strong and distinct representation of participant networks, as evidenced from attendance at meetings, structured space in the agenda, passive and active structuration within reports etc. (cf. Table 1). In this context, the multi-disciplinary clinical perspective tended to remain fairly uniform across cases. As well as family, it was usual for individual patients to have support from at least one of a network of supporters (patient advocate, 6/8 cases; legal agent, 4/8; Social Worker or similar, 7/8). Four cases had no family or friend present. In one case patient peers might be thought of as part of the patient network. The possibility of important distinctions between the patient view and the family view was noted and representation could have been more pro-active for patients. The indirect perspective was more complex. The most prominent feature was the subdivision of perspective between that of commissioning (with responsibility ultimately for resourcing the care pathway) and that of legal and regulatory considerations. With regard to the commissioning perspective, in this investigation there appeared to be a dis-connect with the CPA process, with very limited representation in reviews. Meanwhile, beyond formal legal considerations, there appeared to be little representation of other regulatory or policy considerations such as may interest Trust governance (e.g. practice

guidelines). Therefore there would appear to be evidence of a problem of configuration of mental health service as seen through the lens of CPA review with indirect stakeholder perspectives.

b) Operant Resources

The consideration of operant resource as reflected in the documentation remained narrow rather than systematic. Also, it was not always clear what should be deemed an 'operant resource'. This might suggest a service specific structured model for mapping potential available resource would be an advantage. In other words, there was not a comprehensive review of relevant resource that might be available from participants and their networks. With that limitation however, overall there was evidence of *some* consideration of operant resource relating to each perspective. This included attitude and skills available to patients, contribution of family and carers and clinical care options available. Again, the contribution of indirect stakeholders was notably less prominent. This included an apparent lack of consideration of complex resources bound up in best practice guidelines such as those proposed by NICE (the UK 'National Institute for Health and Care Excellence'). There was also a lack of consideration of relevant supply network resources (community care options) within the purview of commissioners.

c) Platform

These cases encompassed a notable multiplicity of structural forms that served in varying ways as platforms to support engagement and exchange, loosely framed by the CPA review process. There was some limited convergence between patient and clinical participants in some cases. An overarching, inclusive framework to structure these diverse forms would have been an advantage. The most prominent platform consisted of the theme that patients should attend an activity programme, that patients would 'move on' (transfer to another unit or leave hospital) and that the mental health act would be adhered to. For two patients an alternative structure was represented, which consisted of more passive attendance of activities with the apparent purpose to maintain the status quo and not move on, at odds with the more usual clinical purpose. Again, a commissioner perspective was not clearly structured into proceedings.

d) Outcome

There was not a sharp focus on outcome evident in terms of service objectives being categorically met or otherwise, rather the emphasis was on 'making progress' as it was deemed for each case. Outcomes were principally assessed by qualitative evaluation, with varying degrees of structure. There was only a minor level of empirical measurement. It may have been that accomplishment of tasks (process outcomes) or compliance with legislation (regulatory outcome) rather than service outcomes were more the focus of the CPA review. Overall, there were two levels of valued outcomes, against which progress was qualitatively reported. The top level of valued outcome was readiness to move on. The next level consisted of a range of subsidiary valued goals such as improving engagement, improving function and community participation and reducing or preventing risk (including unwanted patterns of behaviour). A more holistic perspective on what 'getting better' might mean for patients was not apparent.

e) Integration

A further process of integration was apparent whereby a sense check of information was made by the collective participants of the review meeting, differing perspectives were reconciled. This issue was most apparent above in terms of the multiple platforms that appear to influence the participants in their view of the care process. From specifically assessing this theme, it was apparent that there were mechanisms for resolving the issue of integration however. Predominantly the structured discussion within the CPA review meeting addressed this issue. In one case a special 'best interest' discussion was referred to whereby a particularly complex resolution to different views could be established. In some cases the integration was structurally supported through the way that documentation was employed to incorporate perspectives (4/8 cases). In some cases (2/8) the clinical and patient perspectives were at cross purposes, but the fact of this was integrated into discussion for further consideration. The issue of integrating the commissioner perspective however has appeared as a general theme within these cases, and of particular emphasis for 3 out of the 8 cases from this aspect of the analysis.

The internal validity of the Cross Case Analysis studying Cases as outliers

A key validity check within this investigation was to study the consistency of findings, against outlier effects that might arise if there were distortions introduced by individual cases. For example findings might be influenced through systematic differences of practices between clinical teams. Alternatively, variation in access to documentation might account for differences in finding. Therefore to study this, sub themes were identified that could only be attributed to 1 or 2 cases. These were mapped against the four service areas, the individual Cases, the clinical team as denoted by the Responsible Clinician or Consultant (RC) and the number of documents available for the analysis. Overall, there were no identifiable patterns attributable to effects of different service areas or the particular Responsible Clinician and associated teams. Therefore the case sample has allowed a rich picture to be developed with a low likelihood of confounding effects from clearly atypical cases.

Discussion

This study has investigated the applicability of a networked model of SDL (NSDL) to the phenomenon of the CPA case management function in a specific UK mental health service. The study of documentation of a sample of CPA review meetings has been adopted as a means of obtaining a view on the CPA care process. The implications of the findings will be discussed against the applicability criteria outlined above, followed by a discussion of areas for further work.

1. The elements of the CPA review meeting were plausibly and consistently captured by the NSDL model. For a researcher familiar with the process of CPA review the template developed from networked model of SDL proposed was very helpful in capturing the elements of the CPA review process. It was reassuring to observe the consistency with which themes were reflected across cases, supporting the inter-textual validity that Atkinson and Coffey (2010) associate with good documentary research. The only theme that was not clearly evident from the SDL approach was that of integration. This theme referred to the process of reconciling different stakeholder perspectives, leading to actionable conclusions.

It is the case however that this was a relatively small sample of cases and it would have been ideal to triangulate these findings with other sources. The documentation of CPA review reflects a reality that is a subset of the CPA review process as a whole, which in turn is a subset of the sum total of service practices involved in patient care. In particular, given the prominence of the findings relating to commissioners, some further specific study of that perspective would be in order to confirm whether these cases typically represent how commissioners relate to the CPA process and to understand whether there might be other meetings or systems of relating to patient care that can be judged as adequate and appropriate alternatives. Other issues to acknowledge are that there may well have been sources of variation in the process of recording and production of documents that were not detected. Further, having selected a systemic sample to ensure coverage of the diverse service areas, the potential contribution of difference in practice between service areas could usefully be studied in more depth with a larger sample.

Therefore, this study has provided a degree of support for the applicability of the NSDL model in capturing elements of mental health service process, as revealed by the CPA case review. Further research is required to confirm this finding, and the addition of a further theme of integration would be consistent with some limitation in fact to the scope of the model, to be further explored in theory development.

2. The elements of the model lent themselves to practical general usage in understanding service ideas. It was encouraging that the constellation of ideas that go to make up SDL in context could be found to have applicability in such a complex service area as mental healthcare. In other words if it can work in this challenging service environment it should work anywhere. As discussed above, the applicability did have some limitations. Each element required a degree of interpretation in the investigation. The network perspective in particular could have benefitted from a more sophisticated assessment. This would suggest the need to further clarify and standardise the concepts and for work to develop suitable measures for capturing these concepts more objectively in further research.

Also, in practice, in many respects these elements were interdependent, and that interdependency was crucial to their meaning. In other words it did not make sense to think of operant resource except in the context of the network, nor to think about outcomes except in the context of platform and operant resources. This supports the holistic investigatory approach advocated by Winklhofer *et al* (2007) and the ecological perspective intrinsic to the Spohrer and Maglio approach (Spohrer; Maglio, 2010; Lyons; Tracy, 2013). Hence although there is literature that for example specifically studies 'co-creation' as a distinct phenomenon (such as McColl-Kennedy *et al.*, 2012), this investigation would suggest caution in interpreting those that do not include a perspective on the wider elements of the system. There is an issue that the model combines concepts from different theoretical roots however, an issue discussed by Möller (2013). The pragmatic route would be to allow the NSDL model integrity only in so far as it was able to have practical real world utility. In the first instance the investigation is encouraging in this respect.

3. The NSDL model application shows consistency with previous theoretical and empirical research. These findings demonstrated consistency with other literature. For example, Grönroos' (2011) conceptualisation of a staged process of co-producing operant resource, followed by joint value co-creation was supported by these findings. Here, the process was akin to assembling elements of operant resource, which in different cases to different degrees had achieved a level of integration in the co-creation process at the point of the CPA case review. The reflection on Grönroos (2011) model however is that this data captured some integration and co-creation of value in some areas prior to the point of review, whereas in other areas the CPA review itself became part of the mechanism for integration. Further, in other areas the opportunities for integrating resource were overlooked (suggesting areas for service improvement). It might be that Grönroos (2011) two stage process is too simplistic, particularly for complex multiple stakeholder service exchange. In other words the flow of service might be better thought of in terms of a multi-stage series of minor assemblages of operant resource elements, with an incremental process of episodes of integration and value co-creation building to an overarching experience of value over time. In this context, the additional theme identified of 'integration' could be thought of as 'overarching integration' as a necessary extension of Grönroos' model in order to accommodate complex service exchange.

Meanwhile, in more empirical terms, there is an interesting parallel to McColl-Kennedy *et al*'s (2012) study of co-creation style in healthcare. The striking feature of their study was the variability of co-creation style within healthcare, linking to variability in clinical outcome. Similarly, in this study there was variation to how different individuals engaged, even being at cross purposes with the clinical team in some cases. In some cases there was clearer pro-active integration of patient and professional perspectives compared with others. This resonates with other literature that argues 'the customer' represents a complex agent and might not want the properties others attribute to them. For example, some criticise the simplistic assumption that all customers engage with 'choice' (Rust and Thomson, 2006; Winklhofer *et al*, 2007; Nijssen; Hillebrand; de Jong; Kemp, 2012; Porter; Lee, 2013). Some authors argue for the idea of a sub-group of 'Lead Customers' who perhaps can engage more pro-actively and more influentially, but for others that expectation might be counter-productive (Von Hippel, 2005; Nijssen, *et al* 2012). Therefore, a more sophisticated conceptualisation of the participant actors in the NSDL model may be further required. Illustrating this point, the variability to the patient perspective has already been discussed above. The engagement and connectivity of commissioners with the CPA process was also a key question to emerge from this study.

4. The application of the model had the potential for impact on service improvement.

In healthcare improvement, there is a call for methodology development to better understand "practice based evidence" (Green, 2006) and better understanding from the individual case (Baker, 2011). This investigation makes a useful contribution in this respect by illustrating the use of a simple ecological model to structure critical reflection on care processes in the individual case. From the rich picture developed a series of areas for potential service improvement were identified. These areas included for example the need for a fresh perspective on the engagement of commissioners in CPA; ideas for better integrating the perspective of patients and other stakeholders; the value of a structured, overarching framework or platform of care; the prompting of key questions as to how to understand valued outcomes.

Consideration needs to be given to the extent to which the findings of a small selection of cases might be transferable to other healthcare settings. First the sample was selected to represent a broad spread of practice within only one Healthcare Trust and therefore findings need to be interpreted with caution. The consistency of findings across cases supports at least local transferability within the organisation, though. There is only limited previous research in this area, as indicated above. However, reports of better configuration and engagement in CPA being valued by patients (Rose, 2003; Carpenter, 2004) are consistent with the idea of the NSDL model as a helpful structure to guide the participants towards that. Although the CPA case management system is common to all care settings, nevertheless more research is required to establish the wider usefulness of the NSDL model in other healthcare settings.

5. The findings supported the possibility of progress towards a normative theory.

Putting the arguments together, this investigation has explored the applicability of a networked model of SDL, from which there is evidence of the interdependent relationship between the constituent elements. Further work is needed to improve the clarity of the constituent elements, and to develop suitable measures. Adopting Christensen's (2006) approach to theory building, there is in fact an opportunity to move to a normative model approach. Following McColl Kennedy *et al* (2012), outcomes might well be a function of configuration service elements (eg choice of co-creation style). Therefore, if suitable measures could be identified for the constituent elements of the NSDL model, a testable normative theory might be proposed and a causal relationships investigated between network connectivity, the assemblage of operant resource from all quarters and the quality of a platform to structure care, with valued outcomes as the dependent variable.

Conclusion

This small study has provided confirmation that a proposed, simplified networked Service Dominant Logic (NSDL) model can form a useful tool in representing service exchange in the complex mental healthcare setting of a Learning Disability Trust. Further confirmation from a larger case series and in different organisational settings would be indicated. The interdependency between the constructs forming the model was a notable feature and further work is indicated to refine the model. It would also be interesting to explore the applicability of the model further to consider whether the model could be operationalised for use in a more normative paradigm. A number of practical areas for service improvement were suggested. It might be that further development of this methodology within mental healthcare would be of assistance in finding ways to improve the configuration and impact of services for people.

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Multilatinas and the growing service economy in Latin America: A Challenge for EU-Latin American business relations

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This paper studies the development of the growth of service industries in Latin America and their connection and integration with regional and global value chains, and the development of integration of service economies in Latin America. Relating to ongoing or concluded negotiations of free trade agreements as well as trade and investment partnerships between the EU and separate Latin American countries, e.g. Mexico, Colombia and Chile, with ambitions to in the future also to comprise Mercosur. Also the initiated TTIP negotiations between EU and USA will have an indirect impact to Latin America in general and Mexico in particular, due to the NAFTA connection.

1 Introduction

The service industry has for a long time been the biggest part of the most advanced economies in the world. This development is rapidly also transforming many of the world's emerging markets in Eastern Europe, Asia and Latin America. The value-added within global production chains is becoming to a larger degree determined by knowledge and service content (WIR, 2013). Services also play an important role for manufacturing firms, where a large part of the offer to customers today is a combination of goods and services. This paper studies the development of the growth of service industries in Latin America and their connection and integration with regional and global value chains, and the development of integration of service economies in Latin America. In the perspective of the ongoing or concluded negotiations of free trade agreements as well as trade and investment partnerships between the EU and separate Latin American countries, e.g. Mexico, Colombia and Chile, with ambitions to in the future also to comprise Mercosur. Also the initiated TTIP negotiations between EU and USA will have an indirect impact to Latin America in general and Mexico in particular, due to the NAFTA connection. Europe was in the early decades after WW II a key economic partner to Latin America, but has gradually lost this position to first North America, and thereafter to Pacific Asia. It is therefore a challenge for European business to, at least partly, recapture its previous role, although now as an equal partner rather than as a postcolonial master. Cooperation within the field of service industries may provide a better platform for mutual benefit than the old relation of exploitation of raw material resources and cheap industrial labour.

The regional economic characteristics and fundamentals play a vital role in the development of the service industry. For many emerging markets the growing service industry is also a way to reduce the risk of getting stuck in the so-called middle income trap, where the cost advantage is diminishing and the ability to compete with the advanced economies is limited.

Additionally, a growing service industry can facilitate the shift from informal to formal economic activities. In turn it enables a bigger tax base to be used for welfare creation. The economic development in Asia has attracted much attention and there is also an increasing interest in the development of the regional service industries (ADB, 2012). The economic transformation has been driven by the establishment of complex regional production networks and the willingness among policy makers to create regional service or knowledge hubs in capital and metropolitan regions. Studies of the growing service industry in Latin America are less frequent particularly due to structural connection to global value-chains. The service industries will, however, be a similar positive force for future economic development among the emerging markets in the region. The challenge is connected with the issue of how to make use of regional economic integration, up-grading existing value-chains and develop the knowledge intensive service industry, which is a vital intermediary actor in terms of productivity, innovation and restructuring in advanced economies.

The underlying opportunities with mostly common language, similar cultural structures and trade collaboration such as Mercosur and the impact of a concluded trade and investment pact with the EU, can form a platform for further development. Examples of internationalization among firms in the region, so-called Multilatinas, are often found in relation to the service industry, such as banking and finance, insurance, retail, telecom and business services. These firms can take advantage of the expansion possibilities that exist and rapidly expand beyond their closest geographical context. This conceptual challenge to traditional theories of internationalization has gained strength in studies of emerging market multinationals (Mathews, 2009; Ström & Ernkvist, 2012). Forerunners in this development have been a number of Chilean and Brazilian companies expanding across the continent. These firms might also use their advantages to expand further out on the global market and become competitors to established multinational companies in the advanced economies in Europe and North America.

2 Latin America and the world economy

There has during the long process of globalization of economic activities been a continuous scholarly debate within the fields of international business, economics and international political economy on why firms emanating from Latin

American countries have not taken part in this dramatic transition to the extent one could expect, considering the economic size of the region, as well as its abundance of natural resources within almost all sectors of industry. Half a century ago, in 1963, the share of Latin America in world trade of goods amounted to roughly 7 per cent, compared to 6 per cent in 2013.²⁴⁴ Southeast Asia on the other hand²⁴⁵, a region that in many respects can be compared to Latin America, when it comes to population size, resource endowment, and a history of political and economic dependence on superpowers in Europe and North America, accounted for 3 per cent of world trade in 1963 and 7 per cent in 2013. The EU trade relations with Latin America have stagnated during the last fifteen years at about 2–2.5 per cent of its total foreign trade in goods (or about 8–10 per cent of EU external trade). It is also a remarkable fact that the intraregional trade in Latin America has not grown during the past decades. Its share of total trade is still below 20 per cent, the same share as in the 1960s, despite numerous concluded free trade agreements, customs unions and common market treaties in various constellations. This figure can again be compared with Southeast Asia, where the intraregional trade within ASEAN10 has grown from about 15 per cent to 30 per cent since the mid 1960s.

Also in terms of foreign direct investment, the Latin American countries are underrepresented, even though there is a slow, but continuous increase of the shares of total FDI stocks and flows over time. This notion is particularly valid when it comes to the service industry. The share of IFDI stock in manufacturing and service industries in 2012 amounted to a little less than 8 per cent of the world total, compared to 5 per cent in 1990, while the share of OFDI stock was only about 2.6 per cent both in 1990 and 2012.²⁴⁶ The entire OFDI stock from Latin America – 608 bUSD in 2012 – can in this context be compared to the one of Sweden, which amounted to 408 bUSD in the same year.

Accordingly, outward FDI from Latin American companies can in the best of interpretations be seen to be in an initial stage of development, and that the potential for further growth is huge. The aggregate figure of 608 bUSD is furthermore concentrated to a few geographic origins, in which firms from three countries – Brazil, Mexico and Chile – account for almost 80 per cent of the total OFDI stock. In addition, firms originating from Argentina and Colombia account for about 5 per cent each. Looking at the outflows from these five countries, the development has rather been stagnant or even negative in Brazil, Argentina and Colombia during the last years, with only about 3.5 per cent of the world total in 2012, so the only positive remaining examples of any significance can be observed in Chile and Mexico.

It has been pointed out that the modest volumes of OFDI do not properly reflect the dynamism of Latin American TNCs' productive activity abroad as revealed by the increase of cross-border acquisitions (UNCTAD 2013:59) where there has been a growing trend recently to acquire companies both in the developed economies in Europe and North America and in neighbouring countries. The largest single cases in 2012 within the service sector were the 3.4 bUSD acquisition of the Brazilian airlines *TAM* by *LAN Chile* and the Chilean retailer *Cencosud*, which acquired an affiliate of French *Carrefour* in Colombia for 2.6 bUSD, and the *Prezunic* grocery store in Brazil for 0.5 bUSD (ibid: 59 and 88). Another example was the Chilean bank *CorpBanca*, which acquired a stake in its Colombian unit from Spanish *Banco Santander* (ibid.).

3 Global networks of production of goods and services in the Latin American context

There are a number of crucial issues to take into account when assessing the emergence of new transnational companies with Latin American origin. In this context the focus will be on emerging service TNCs.

- Upgrading in the global value chain within the framework of new industrial policy measures;
- Transformation of the economic structure in the domestic markets;
- Nearsourcing;
- The trade political context at the regional and global level.

Upgrading in the global value chain

The abundance of natural resources in a region can be seen as a rich opportunity to create economic growth and welfare also in advanced manufacturing and services, but has in many cases turned out to keep the resource-rich country in the 'raw material trap'. The potential for upgrading to capital- and knowledge based elements in the GVC, i.e. in the mineral-, energy-, forest- and agricultural industries, was during a long time admittedly held back by foreign MNEs, wishing to benefit from more profitable value-adding activities elsewhere. But the extensive schemes of nationalization and domestic privatization of resource-based companies that have taken place in almost all Latin American countries during the last 3-4 decades contradict the widespread statements that foreign-inflicted resistance should still constitute a barrier towards domestic industrial and service-based upgrading. Rather, lack of capital, local access to technological knowledge and entrepreneurial tradition may be main hurdles to an emerging internationally competitive service industry, e.g. in industrial maintenance, research & development, technical consultancy, consumer product branding etc.

²⁴⁴ All statistical figures in this section are from IMF, Direction of Trade Statistics Database, visited March-April 2014, and UNCTAD, World Investment Report, various issues.

²⁴⁵ Defined here as the ten members of ASEAN.

²⁴⁶ Latin America and the Caribbean, excluding the largest offshore financial centres, British Virgin Islands and Cayman Islands (UNCTAD, 2013).

Since services to an increasing extent are embedded in the competitive performance of the large manufacturing MNE, the absence of internationally successful manufacturing enterprises built on indigenous resources, may also constitute a setback for the rise of global service firms from Latin America.

Transformation of the economic structure

Typical for the economic transformation process of the Latin American countries has been the relatively modest level of the secondary (manufacturing) sector. In the majority of advanced as well as of Southeast Asian emerging economies, the share of manufacturing related to the primary and tertiary sectors reached during the process of industrialization a peak at about 30-40 per cent of the total employment, after which it has declined, due to the continuous rise of the service sector. In Latin America, on the other hand, the peak of manufacturing reached seldom above the 30 per cent level. There was instead a direct transformation from the primary to the tertiary sector in Latin America, where today the share of total employment in most countries exceeds 60 per cent, with the highest level among the largest economies is recorded in Chile with more than 66 per cent of the working employment in the service sector (2010 figures).²⁴⁷ The direct shift from agriculture to services has to some extent led to a situation where a competitive edge in manufacturing has not been built up to the same extent as in e.g. Southeast Asia, and subsequently a relative lack of manufacturing-based service production activities.

Nearsourcing

It is usually argued in the scholarly debate around the emergence and development of global value chains that the phenomena of outsourcing and offshoring have played an instrumental role when it comes to further fragmentation and specialization of manufacturing production. Arguably, there is a 'Janus face' of outsourcing and offshoring, meaning that these activities can on one hand be seen in the perspective of exploiting differences in factor costs between centre and periphery, and in that respect also being an important explanation behind the origin of asymmetric dependencies between rich and poor countries; on the other hand may the hosting of outsourced and offshored activities be seen as a deliberate strategy among emerging economies to attract foreign capital and to subsequently build up indigenous capabilities to manage upgrading in the value chain and in that respect to support future growth of domestic consumer demand. The 'dependency' debate during the 1970s, which was particularly marked in Latin America, represented very much the first face, and may in the long run prevented the widespread use of outsourcing and offshoring activities that became a main tool of industrial transformation in emerging economies in East and Southeast Asia. However, the inbuilt dynamics of outsourcing and offshoring is, if successfully applied, their contribution to the levelling out of production costs or at least diminishing of the gaps between centre and periphery – i.e. the logic of outsourcing and offshoring is a high degree of geographical mobility. There is also the intricate balance between supply-chain costs and production costs, that has during a long time been kept by a continuous decrease of the share of total transport costs in the final consumer product. The trend of 'nearsourcing' - the recapturing of outsourced and offshored activities to the home market itself or to its vicinity - that has been seen recently is still a marginal phenomenon, but may play a larger role in the future when it comes to the reconfiguration of global value chains, and can result in a larger gap between production locations that will benefit from proximity to the large consumer markets, and those which could be even more peripherally located. In the Latin American context, Mexico and parts of the Caribbean region may belong to the first category, while the rest of the Western hemisphere could suffer from the 'tyranny of distance'. Within the field of service industry the phenomenon of nearsourcing will still be closely related to manufacturing, particularly in the case of research & development, maintenance and distribution, but less likely in banking/finance and retailing.

The trade political framework

Trade in services are generally regulated at the multilateral level within the framework of the General Agreement of Trade in Services (GATS). In the absence of a completion of the multilateral Doha Development Agenda, within which the GATS and the ongoing Trade in Services talks, also is to be extended and revised, almost all member states have to different degrees made efforts to seek other routes to further liberalization of trade in both goods and services, particularly through regional preferential trade agreements. The main current endeavours in this respect under negotiation - the *Trans-Pacific Partnership* (TPP), and the *Transatlantic Trade and Investment Partnership* (TTIP) – will, in case of successful completion, have a large impact of MNEs in Latin America, both in terms of trade in goods and services, as regarding investment. The TPP talks involve directly three Latin American countries, Chile, Mexico and Peru, who, together with Colombia, also have taken steps to form an own trade pact, The *Pacific Alliance*. Mexico is furthermore an integrated member of the *NAFTA* bloc. The Pacific Alliance can be seen as a main competitor to the other main trade bloc in the continent, *Mercosur*, consisting of Argentina, Brazil, Paraguay, Uruguay and Venezuela, which was created in the early 1990s, but which has so far failed to meet the early high expectations of successful implementation. Thus Latin America is at present rather disintegrating than integrating, and the aims to forge deeper trade and investment relations with other continents – Asia-Pacific, North America and Europe – are more articulated and active than the visions of a comprehensive *Community of Latin American and Caribbean States* (CELAC).

²⁴⁷ World Bank, 2013, table 3, p. 352f.

4 The European Union and Latin America²⁴⁸

The EU has, like all other advanced economies, initiated talks regarding free trade with different regions in the world. The largest effort directed to Latin America has been the EU-Mercosur talks with five South American economies, re-initiated 2010 after a six year pause. These negotiations aim at resulting in a comprehensive trade agreement, covering, apart from the usual trade in goods, also services, public procurement, intellectual property rights, trade facilitation schemes and technical barriers to trade. The results have been insignificant so far, and very little progress was made in 2013, among other explanations due to the political and economic situation in Venezuela and the suspension of Paraguay. From the Mercosur side, the EU is an important partner, comprising about 20% of its external trade, and also a key investment partner, but only about 3 per cent of EU's total trade. Furthermore, EU has also closed various bilateral comprehensive free trade agreements with Latin American countries, comprising both goods and services, notably Mexico, Chile, Colombia and Peru, an Association Agreement with six Central American states, and Economic Partnership Agreements with fifteen Caribbean states (CARIFORUM). The combined result so far of all these efforts is rather a hub-and-spoke structure of trade and investment relations between EU on one hand and different constellations of Latin American states on the other, even though there has been an explicit ambition to forge separate agreements together to a comprehensive regional structure, or, at least, to work for converging separate agreements in order to pave the way for increased intra-regional cooperation at the firm level.

5 Literature review and theoretical framework

The service sector is large and growing extremely rapidly. It is also becoming much more complicated as radical technological solutions are developed to support the provision of many service functions. Services used to be considered to be local activities that were produced and consumed at the same time and in the same place (Hill, 1977). Technological developments have transformed services by challenging the relationship between place of production and consumption. Many business services involve the creation of high-value added customized services. Recent developments, however, have led to pressures coming from larger client companies to strip costs and profits from suppliers of advanced business services. Technology and especially the ability to create teams that draw upon experts located in low-cost economies have led to an on-going commoditization of some business service functions. This is especially the case in relation to accountancy, consultancy and law. Technology including new knowledge management systems combined with intranets is transforming the production of these services.

A good can be sold without any direct relationship between the manufacturer and consumer. Many services can also be consumed in a similar way. Nevertheless, the importance of face-to-face contact involved in the simultaneous production and consumption of a range of services plays an important role in differentiating the new world of service work from that of manufacturing. At the centre of interactive service relationships are three important elements: the quality of the client interaction, an individual's or firm's reputation and embodied knowledge. The importance of reputation cannot be under-emphasized for the consumption of services.

Producing any product or service involves service expertise to be embedded in different parts of the production process – pre-production, during production and post-production or consumption. Pre-production involves understanding the design process, including market research and the ability to innovate. This may involve the design of a production process or of an actual product or service (Bryson and Rusten, 2011).

The dearth of empirical research on services and internationalization reflects the absence of official statistics on the service sector in general and on service trade in particular. Available datasets are limited by industry, geography and time series. Due to the difficulties of classification, conceptualization and measurement problems, research on service internationalization research is complicated. Traditional international trade theories such as the Heckscher-Ohlin have been used as a frame of reference for exploring service internationalization. But this analysis concluded that trade theory developed to explore trade in good does not help to explain trade in services (Daniels, 1993; Bryson *et al.*, 2004; Dicken, 2011). Government regulations, cultural differences and language differences are extremely important for service internationalization (Beyers, 2012). The debate about service sector FDI has become important since it is a preferred way for companies to move abroad and is specifically determined by locational factors (Rusten and Bryson, 2010).

Studies of internationalization and services have focused on more specific sub-sectors and have often explored internationalization strategies (e.g. Jones, 2002; Bryson 2007; Schultz, 2005; Ström and Mattsson, 2006; Faulconbridge *et al.*, 2008). Firms located in major metropolitan areas, are more likely to be confronted with various internationalization opportunities. Firms in more peripheral areas also show an interest in working internationally, but activity is more limited.

There are major differences between trade in goods and trade in services (Daniels; 1993; Bryson *et al.*, 2004; Dicken, 2003). Firstly, even though information technology has helped to bring parts of the world closer together, much of the activities within the service industry must take place simultaneously and maybe even at the same location. It is often important to have direct contact between producer and buyer. Secondly, the service industry is still heavily regulated in many countries, which affects the possibilities to trade. In some counties the import of services from

²⁴⁸ Main source: European Commission, Memo/13/1080, December 3, 2013.

foreign providers has been prevented though regulation. Finally, there are many obstacles to trade with services such as non-tariff-barriers. These can be of a very different character, such as licenses for legal advisors, medical doctors, accountants, qualifications, language etc. These play an important role as barriers in preventing international service trade. Cultural problems are evident for any kind of international transaction, but in the case of service industries they may be an absolute barrier (Jones, 2002, 2005; Ström, 2005). These barriers have their greatest impact on verbal and media-based services, but standardized and highly technological services may be exceptions to this general rule.

Another important issue for the internationalization of service production is the complexity of value-added in relation to manufactured goods (Daniels, 2000; Daniels and Bryson, 2002). The question of value-added is both valid in relation to where this is produced but also how the value added is traded in relation to the indirect contribution made by services in the exports of goods. In relation to the classification and conceptual difficulties associated with service trade, empirical findings show that the direct contribution of services to national exports is growing slowly and the pattern of trade is highly concentrated. Instead it might be useful to acknowledge and nurture the indirect contribution of services to overall national export activity. Service firms provide functions that support the export of many manufacturing sectors and this enhances total export competitiveness. Specialized services may become embodied in goods leading to the production of goods/service bundles for export (Daniels and Bryson, 2002). These bundles may provide firms with a source of inimitability – a source of competitiveness that provides differentiation in global markets (Bryson, 2009).

The lack of service research in Asia and other emerging markets such as Eastern Europe and Latin America has attracted increased attention (O'Connor and Hutton, 1998; Ström and Yoshino, 2009; Harrington and Daniels, 2006; Daniels et al., 2012; Di Meglio et al., 2012; ADB, 2012). The interconnectedness of mature economics in Europe and emerging markets in East and Southeast Asia has created a complex economic network of production and knowledge networks where services are playing an increasingly important role. It resembles to some degree the economic geographical transformation in Europe where the new members states of the European union have been connected through market widening and increased FDI, but where the economic integration of the service economy has yet to materialize in Asia (Alvstam et al. 2009; Ström and Yoshino, 2009; ADB, 2012). It is noteworthy that China is developing policies to enhance the effectiveness of Chinese business services and this might lead to the development of Chinese service competitors that may challenge European and American service providers.

Service Offshore and Different Types of Service Internationalisation

Service offshoring occurs when firms shift production to foreign locations. The objective may be to reduce costs, to service a foreign market, to reduce exposure to country risk, or to access skilled labour. An additional factor influencing the location of offshore service centres is the requirement to provide a 24-hour service to customers or an extended service beyond standard working hours. The cost of providing such services can be high as late shift workers must be attracted by higher wages or extended holidays. Advanced call-routing and networking technologies enables companies to get around this by implementing a 'follow-the-sun' geographical policy. Companies can link two or more call centres together with each open from between 8 to 12 hours per day. Country risk is removed when a company is able to shift the provision of a function between facilities located in different countries.

Service offshoring is not easily analysed because service tasks can be traded in four ways (United Nations 2002: 1):

Mode 1: *cross-border supply* occurs when suppliers of services in one country supply services to consumers in another country without either supplier or consumer moving into the territory of the other.

Mode 2: *consumption abroad* refers to the process by which a consumer resident in one country moves to another country to obtain a service.

Mode 3: *commercial presence* occurs when enterprises in an economy supply services internationally through the activities of foreign affiliates.

Mode 4: *presence of natural persons* describes the process by which an individual moves to the consumer's country to provide a service, whether on his or her own behalf or on behalf of his or her employer.

Three of these modes are concerned primarily with service transactions between residents and non-residents. Mode 1 involves the provision of services that require no direct contact with customers but procedures must be developed to overcome cultural and language barriers that exist between countries. Recently, there has been a particular interest in Mode 3, whereby enterprises supply services internationally through the activities of foreign affiliates (Bryson et al. 2004). For services, the Mode 3 'method of serving foreign markets is particularly important because it is often the only method that permits the close and continuing contact between service providers and their customers necessary to compete effectively with indigenous firms' (United Nations 2002: 54). In this instance the provision of services through foreign direct investment represents a type of *captive offshoring* or offshoring without outsourcing. Captive offshoring enables a firm to retain control over its assets, intellectual property and core business processes (Bryson, 2007). But captive offshoring creates value for the home of the service provider, but not necessarily local employment. The implications for Europe would be that service FDI by European firms will create employment opportunities in host economies and not in Europe. Europe would provide by FDI being undertaking foreign service providers. It is noteworthy that the development of the internal market for services will create new employment opportunities within Europe.

Trade in services must address cultural differences between countries that restrict the ability of service providers to export standardized services. Modes 3 and 4 enable service providers to localize provision to take into consideration

local cultures and client expectations. Modes 1, 3 and 4 involve what is commonly termed 'service offshoring' or more correctly 'service global sourcing'. This is encapsulated by the concept of a 'second global shift' (Bryson 2007). The first global shift involved the relocation of manufacturing employment to low-cost production locations while the second implicates services in this process. There have been three distinct phases to the second global shift. First, during the early 1990s IT programming, testing and network support activities were outsourced and then globally sourced. Second, during the late 1990s global sourcing diversified into the provision of back office and call centre functions and also the development of computer applications. Third, during the early years of this century full service centres emerged that provide a wide range of administration, process, contact and support functions.

The development of service offshoring represents a new type of international division of labour, but with a difference. It is various forms of service activity, ranging from call-centre-based work to back-office administration that is being relocated to low-cost locations rather than manufacturing or assembly activities. A number of factors influence the decision to send a particular service activity offshore. First, it must be capable of some degree of standardization that does not require face-to-face interaction with consumers or clients. Secondly, the inputs and outputs required to deliver the service must be capable of being traded or transmitted with the assistance of ICT. Thirdly, some service activities are not fixed in space and can be provided either as a form of foreign trade or by the temporary relocation of a service worker to a client's premises, for example, management consultancy or various forms of auditing. Fourthly, specialist services can be provided from central locations with consumers travelling to avail themselves of the service. In many cases such services would be provided within the confines of a nation-state, but some of these services are being consumed by a form of service-based travel, for example education (secondary and tertiary), plastic surgery and a whole range of other surgical procedures.

Outsourcing services to companies located in other countries comes with a number of risks attached to language, culture and the quality of the provided service. Unlike the first 'global shift', the geography of the second global shift is determined by the educational and language abilities of service workers located in foreign locations that may also perhaps, but not always, be lower-cost locations (Bryson 2007).

6 Multilatinas and the service industry

The Latin American service industry has seen steady increase during the last decades. Primarily the larger economies such as Mexico, Brazil, Argentina and Chile have been at the core of this development. The manufacturing industry and the raw material based economy is however substantial in many regions. Mexico is one example of where inflows of FDIs are taking advantage of the NAFTA agreement and the proximity to the US market, along with a very favourable cost level. The positive economic development has also pushed for increased economic integration within the region through Mercosur, and other multilateral and bilateral initiatives. The industrial base has generated a number of companies working across the Latin American region, but also becoming increasingly active on the world market. Several of the most important emerging market multinational originates from Latin America, such as Vale, Embraer and CEMEX, to mention a few. However, other companies have pushed forward to take advantage of the economic possibilities on the more regional level. During the last decade, smaller countries (in economic terms) in the region have also seen growth being generated through the service economy.

Apart from the growth in Latin America that has been driven by increased demand of raw material, the increasing consumption has also pushed growth ahead. Another important driver of the Latin American service economy is the increased outsourcing and offshoring of service activities that have taken place. The phenomenon has been driven out of demand from North American based firms, but increasingly from other part of the world where multinationals are looking for a location strategy that covers areas where they are active. According to Stark et al (2014), the firms are mainly using four alterations to take advantage of different location advantages in the service value chain; (1) *product upgrading*, trying to achieve a higher value, (2) *process upgrading*, which refers to improvements in the efficiency of production systems, (3) *functional upgrading*, which refers to the movement to higher-value stages in the chain that require additional skills and lastly, (4) *chain or intersectoral upgrading*, which focuses on entry into a new value chain by leveraging the knowledge and skills. The different stages of the economies in the region have enabled service providers to take part in different stages of the value chain. This can be done through handling functions within larger multinational through off-shoring, but also through independent firms. According to a recent ECLAC study the service industry has successfully created thousands of jobs in countries like Chile, Costa Rica, the Dominican Republic, Colombia and Uruguay (Ibid.). The development shows that it is not only the larger economies in the region that could benefit from increasing the share of the service economy. Countries in the Caribbean have also seen the importance of attracting service jobs, through tourism, but also in related business service industries (CNSC, 2014). The small open economy of Costa Rica has also attracted a substantial inflow of service FDI during the last decade, particularly due to a series of bilateral free trade agreements (FTAs) with key trading partners. FDI inflows increased significantly in the early 2000s, mainly in technologically intensive fields such as electronic components, medical devices and global services. The country has actively sought to attract FDI from companies in a diverse set of services such as contact centres, shared services, back office; entertainment and digital technologies, design and engineering, and software (Flores Sáenz, 2014).

Apart from sectors in the region that grows through service FDI and global value chains, there are also sectors that have taken advantage of the rise in income and economic and political stability throughout the region. This includes

firms within retail, finance, insurance and business services. These firms are more of regional Multilatinas at this stage that are utilizing their regional knowledge to expand business. Studies also show that the countries in the region work with different policies for attracting service FDI and developing the domestic industry. Chile has been one of the most active countries in this respect. All ready in 2000 a program was launched to attract investments in high-tech sectors and business services (López et al., 2014). Similar schemes have also been introduced in smaller economies such as Colombia. Here infrastructural investments to support the usage of English, tax reduction for international experts and the implementation of international financial and accounting standards are all important measures to support the growing service economy. The main aim is to create a service industry in relation to outsourcing and offshoring that is globally competitive (Kshetri et al., 2014).

The growth of the Chilean service economy has been driven by a set of factors. First, there is an increasing demand of services in a growing economy where productivity and competitiveness is on the increase. In relation the public sectors has also been in a need of digitalization. Second, the government has launched a number of incentive programs to support the IT industry, through education, facilitate international competition and public-private partnerships. Finally, the infrastructure through broadband has been expanded. All in all, these schemes have been introduced to strengthen the competitiveness and ability of Chilean firms domestically and abroad.

In a study by Hagen et al., (2014) the internationalization and intra-regional trade is evident for Chilean IT service providers. In the survey presented of these business services the Latin American market is very important, but a number of vital export relations with Europe are also visible. See Figure 1 below.



Figure 1. Chilean IT service export.
Source: Hagen, Marinao, Mulder, 2014.

Figure 2 below also shows the result from the same survey of the main barriers to further enhance the export of these business services. The lack of access to networks is seen to be the most important barrier apart from marketing and financing. The result shows how important networks are within the service industry in order to facilitate growth and trade. Further economic integration in Latin America is dependent upon expanding business networks and financing possibilities. The combination of service FDI through offshoring and domestic development is vital for creating sustained growth on the service sector.

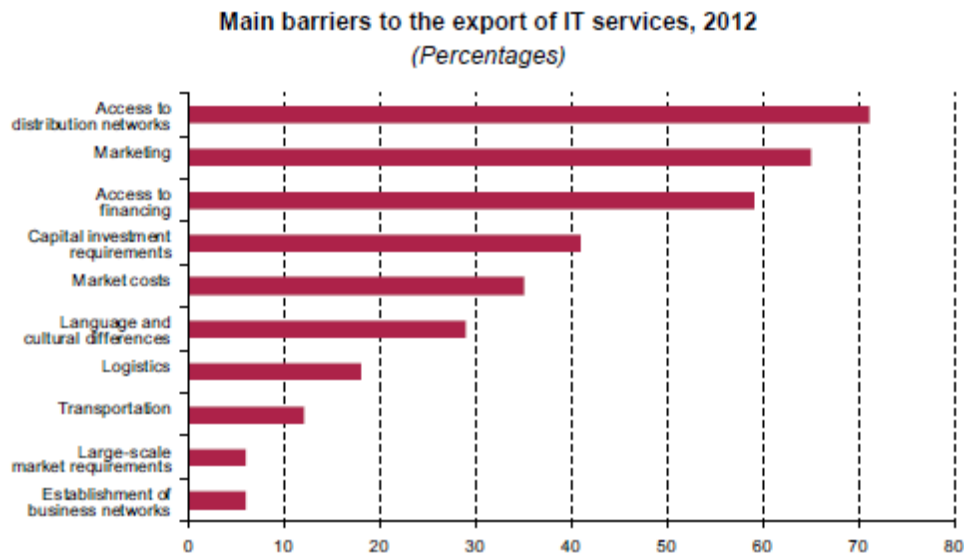


Figure 2. Perceived barriers for Chilean IT service export.
Source: Hagen, Marinao, Mulder, 2014.

Companies from the retail sector have been utilizing the increased income in many countries in the region for expansion. This is an example of regionally expanding firms. These firms could be seen as regional Multilatinas. They use the potential of economic growth and the similarities that exist, such as languages. Companies from Chile have been particularly active in expanding their regional presence. See figure 3 below. According to analysts following the sector it shows signs of growth in many countries. This locational spread indicates that there are regional transformations that would help to increase the development of the service industry. In a recent deal Cencosud finalized the takeover of Carrefour's stores in the Colombia, whereas the competitors have chosen more of an organic growth. This part of the service economy is less driven by FDI from Europe and North America, but rather the domestic development in the respective country. In relation to the retail operation, these firms are also developing their financial service offers to customers, and further services of more advanced character could be added in later stages. In this sense the sectors is complementing the growth of business services through domestic growth and offshoring in IT and other sub-sectors.

Chilean Retailers – Store presence overview (as of 1Q13)

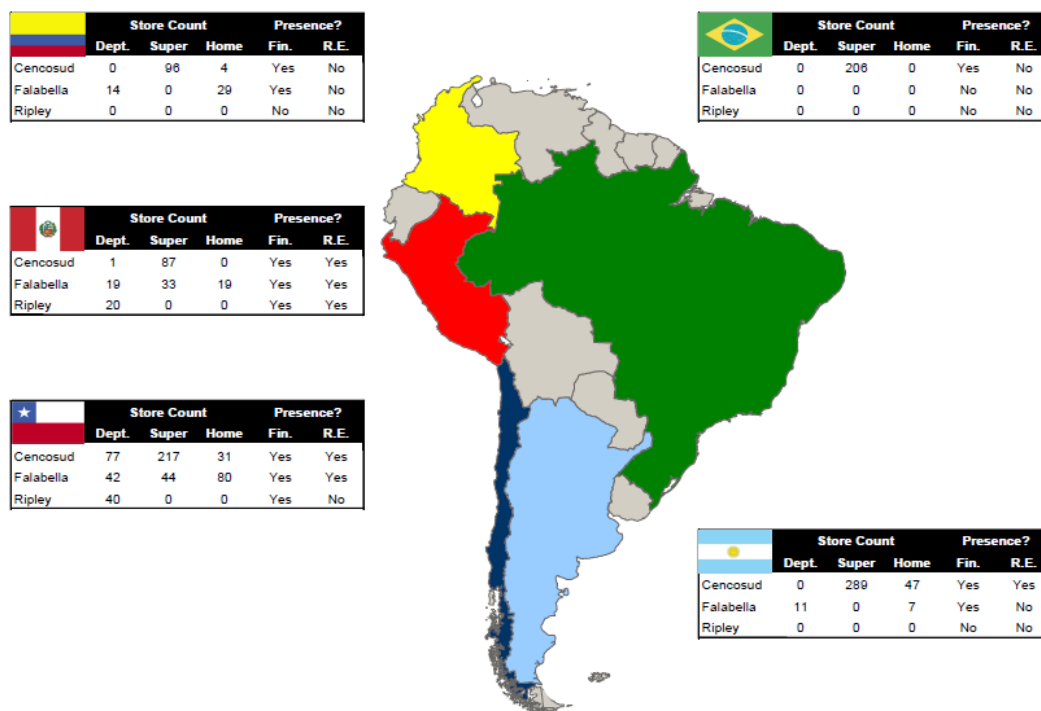


Figure 3. Location of Chilean retailers in Latin America.

Source: Barclays Equity Research, 6 June 2013.

7 Conclusions

The paper shows the complexity of the service industry development in Latin America. There are several connections to the global market through various forms of offshoring activities of services operations. This has helped to enhance the competitiveness and economic growth in several of the countries in the region. There are numerous examples of how governments have actively worked with developing incentive structures for both attracting inward FDI, but also for supporting the domestic growth of services. The paper also shows the differences that exist among the different countries in term of service industry development. In several countries the manufacturing and raw material based economy have created hurdles for further expansion into services. The volatility on the world market for raw materials has also created a situation where the macroeconomic structures have been changing rapidly, making it more difficult to create sustainable structures for the service industry. The service development can broadly be classified into two different areas. One is driven by the connection to the world market through offshoring and back-office functions. The other area is the regional market where Multilatinas are operating in business services and the retail sectors. These firms try to take advantage of the regional economic growth, but with limited prospects in the short run to venture outside the Latin American continent. In this respect the intra-regional Multilatinas will be interesting to follow in the future. The main question is whether these firms can establish enough competitive advantage for long term competitiveness.

The social and economic disparities generate a complex development for the service industry. There are parts of the population that has seen their purchasing power increase and thus generated a base for service industry development. However, due to problematic political circumstances and social unrest, there are also examples of the reverse. This development is also intertwined with the difficulties of getting trade structures working better in the region. Mercosur has not been at all as successful as was hoped from the beginning. This connects to the problems of Latin America in the world economy, where the share has shrunk compared to the situation about half a century ago. Regional political differences and external relations to the EU have not helped to reverse this trend. External influence in the form of Chinese investment is also a highly important aspect in relation to the economic development in the region. With increased trade and investment focus across the Pacific and with the creation of new trading schemes such as the TPP, the role of the EU might be diminishing despite, historical, cultural and language relations. The EU exhibits itself many different priorities among its member states when it comes to perform the common external trade and investment policy according to the stipulations in the Lisbon Treaty. Even though the supranational authority to carry out a coherent and persistent 'one-voice' policy is strong in theory, the reality looks different. The coordination procedure is shared between the Council within its Trade Policy Committee, and the European Parliament, mainly within its Committee on International Trade (INTA). In addition, the preparation as well as the implementation of policies rest within the DG Trade in the Commission. The difference in geographical priorities regarding EU's external trade relations is unsurprisingly closely correlated with the geography of member states, where the Southern-Southwestern MS have been more likely to push for deeper relations with Latin America, and less enthusiastic regarding e.g. the Eastern Partnership or Asia. The aim of ours is to follow up the identification of a number of promising future areas of cooperation within the field of service industries, in order to contribute to a more solid and sustainable platform at mutual benefit between the EU multinational enterprises and the emerging Latin American firms than hitherto has been the case.

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Measurement of service innovation project success²⁴⁹: A practical tool and theoretical implications

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ABSTRACT

This paper presents a first attempt to develop measurements at a micro or firm level of the input to and outcome of service innovation processes. This is not easy because many factors are involved of which several cannot be measured with any precision, and definitely not in money terms. The aim is to develop a tool that can be used by service firms. It is not sufficient to develop a theoretical instrument; service firms should also use the measure if we shall get a valid measure and service firms shall get a useable decision tool. The paper refers research that theoretically develops an appropriate measurement instrument and tests whether service firms would likely to use it. The test is carried out in two steps: First a long-term discussion in a group of service innovation managers, then explorative experiments in two service firms. In the conclusion is a suggestion for a measurement model presented.

1 Introduction

Economic and management science has an interest in understanding the economics of innovation, i.e. how innovation contributes to the economy and how that contribution can be measured. One line of thinking, often based on Schumpeter's (1934, 1939) theories, is that innovation creates economic growth. This idea has almost become a dogma within evolutionary economic theory (e.g. Freeman and Soete, 1997; Fagerberg et al., 2005; Andersen, 2008). It may be true that economic growth can be explained by innovations, but that does not mean that every attempt to innovate leads to economic growth. Indeed this is far from being the case, many, or maybe most, attempts, or projects, lead to losses. We do not know how big the losses generally are, they might be as large as the growth effect of the successful innovations. One hypothesis might be that innovation can be both good and bad and that the losses incurred in attempts to innovate may be of the same magnitude as the growth effect, at least for a period of time. These periods of loss could, theoretically, be assumed to be periods of depression. The problem with ascertaining the veracity of these claims is that we currently lack a way of measuring the losses and gains. Despite all the attempts to measure innovation input and output (i.e. CIS, 2009; InnoMetrics, 2007; European Innovation Barometer (EU, 2013) etc.), we do not have a full picture of the value of innovation because the unsuccessful innovation projects that are stopped halfway through the development process and are not measured or included in the statistics. The losses are therefore under-estimated. To get a more correct picture of the economic effect of innovation behaviour for both society and individual firms, we need to count the input and outcome of *all* innovation attempts, not only the successful ones. This requires tools that can measure the total input and outcome of each innovation project that firms or individual entrepreneurs attempt to carry out. To specify and implement such instruments is difficult, both theoretically and practically, particularly within more complex innovation activities such as service innovation (cf. Gallouj and Djellal, 2010), experience innovation (Fuglsang et al., 2011) and open innovation (Chesbrough, 2006).

Far from all innovation projects and processes lead to outcomes that exceed the input: the market may reject the innovation, development costs can be too high, or organisational barriers and other obstacles may appear in the process (cf. Sundbo, 2013). Firms also have a need for tools that can guide them in assessing which ideas or projects have the largest probability of success, i.e. that the output exceeds the input. This is more difficult in services than in traditional manufacturing innovation because a service is an immaterial product in which employee and customer behaviour and state of mind play a larger role. Thus the market acceptance of the innovation may be more difficult to predict because of these subjective factors in addition to the ever present insecurity about market reactions.

Further, the innovation process is more complex in services because many employees are involved for only part of the time, users are often involved and the innovation activities are spread throughout the organization (Sundbo, 1998; den Hertog et al., 2006). Such inputs are therefore more difficult to calculate. Thus a research aim would be to develop measurements at a micro or firm level which can measure, or at least provide indications of, the input and outcome of service innovation processes. This is not easy because many factors are involved of which several cannot be measured with any precision, and definitely not in money terms.

This article presents a first attempt to develop such measures. Since the aim is to develop tools that can be used by service firms, it is not sufficient to develop a theoretical instrument. If service firms will not use the measure because it is difficult, or impossible, to use in practice or because the service firms do not find it appropriate – despite its

²⁴⁹ Acknowledgement: My colleagues Associate Professor Flemming Sørensen and senior researcher Jens Friis Jensen at Roskilde University have participated in the empirical collection and analysis of data. They have contributed to discussions of the measures.

theoretical eminence – we will neither get a valid measure nor will service firms get a useable decision tool. The research referred to in this article is therefore an attempt to theoretically develop an appropriate measurement instrument and a test of whether service firms would likely to use it. If we can not make laboratory experiments, which we can not in economics, we are dependent on economic actors' willingness to provide the necessary empirical data. This may not, sometimes, lead to the most perfect measures, but to optimal ones (a compromise between the theoretically desirable and the practical possible). However, we do not even know what the practical possible is. Therefore the investigation into which factors service firms are willing and motivated to measure is crucial for establishing a scientific measure and for developing measurement tools that firms can use.

Such an investigation has not been done before. Theoretical models of service innovation (e.g. Gallouj, 2002; Sundbo and Gallouj, 2000) and prescriptions for organization of service innovation activities exist (e.g. Cooper and Edget, 1999), but no concrete measurement tools that can tell about the outcome related to the input have been developed. Measurement instruments for innovative capability (Teece and Pisano, 1994) have been introduced (Forskning og Innovationsstyrelsen, 2008; Damvad, 2011, 2013). However, they do not emphasize concrete inputs and outcomes at the project level, only a general firm capability. There is a lack of such measurement instruments at the project-level. The research referred to in this article will fill a gap in the scientific knowledge concerning which input and outcome factors are really important to service firms and which factors are crucial for success in service innovation processes.

The article discusses the theoretical foundation for a service innovation project measurement tool and, based on this, a suggestion for a practical tool is put forward. The tool has been tested with a group of service innovation managers (a kind of longitudinal focus group, Puchta and Potter, 2006.) and thereafter in two service firms in an exploratory study. The results are discussed in the conclusion.

2 Overall aim and approach of the article

This article is based on research that aims at developing instruments to measure social and economic inputs into and outcomes of service innovation processes. The research investigates areas where service innovations may be valuable and the innovation processes lead to positive outcomes. Furthermore, the article will attempt to develop relevant measurement instruments.

Thus, the article's focus is on the micro (firm or organisational) level; however the knowledge and measurement instruments created during the research will be useable in macro level analyses as well. The ambition is to see how far research can come in developing one simple, overall measure that can show whether an investment in a service innovation process is beneficial and still measure all the important aspects that service innovation theory refers to. Knowing that this is difficult and an ambition that can probably never be fulfilled, this measurement instrument aims at being as systematic and quantitative as possible, which may result in indexing or a compound measure. This is to be investigated in the project.

The research questions are:

1. Which factors should be included in a service innovation project measurement tool if we look at the service innovation theories and earlier attempts to measure service innovation activities at a macro or firm level?
2. Which factors are meaningful for service firms (both because the firms believe in them and because they can be measured by a reasonable resource investment in the measurement procedure)?

3 State-of-the-art of innovation measurement in services

Although there has been much research on service innovation processes over the last two decades (e.g. Gallouj and Djellal, 2010), the field is often in articles (e.g. Drejer, 2004; Howells, 2010) accused of not having one, unified, theory. In other words, no complete and generally accepted framework for sufficient and satisfactory measurement of service innovation exists. Attempts have generally focused on measuring innovation inputs or innovation capabilities (Teece and Pisano, 1994; Damvad, 2011; Janssen et al., 2012). Although this may be seen as a first step in measuring service innovation, it does not suffice. The measurement of innovation output has been confined to the general questions in the CIS (Community Innovation Survey) (Sundbo, 1998; Eurostat, 2004; den Hertog, 2010; Janssen et al., 2012) and the effects of innovation are rarely described (Sveiby 2011). Thus, many scholars call for indicators of service innovation (Abreu et al., 2010; Hipp and Grupp, 2005; Miles, 2009; Schmoch and Gauch, 2009; Steiner, 2001).

The measurement of service innovation and attempts to formulate a theory based on it may thus be an extremely important area of new research over the coming years as measurement instruments are in great demand from managers.

The issue of measuring inputs into and outcomes of innovation processes has been emphasized for a long time, examples being the Frascati manual and Eurostat's CIS surveys. The Frascati manual was created in 1963 and defined innovation and which indicators should be used to measure inputs to and outputs of innovation processes (OECD, 2002). It was a quite narrow instrument that measured economic factors and was based on R&D as the leading innovation activity. In 1992 it was extended to include the Oslo manual with more organisational input indicators and more output indicators than just growth and profit (OECD and Eurostat, 2005). The Oslo manual is the basis for the CIS surveys that Eurostat carries out regularly (Eurostat, 2004).

Many other research based models and instruments to guide innovation processes and innovation investment in firms have been offered (e.g. Cooper, 1988; Burgelman et al., 2004; Lundvall and Nielsen, 2007 based on a knowledge economy approach, or Foss (2003) based on the Resourced Based View). These instruments are primarily grounded on the R&D approach and are generally oriented towards manufacturing (although some of them such as Cooper and Edget (1999) have been applied to services).

We may conclude that existing instruments for measuring innovation inputs and outputs are incomplete and not oriented towards service innovations. An increasing amount of international research carried out in the last two decades shows that innovation in services has characteristics in common with innovation in manufacturing, but also some differences (e.g. Boden and Miles, 2000; van den Aa and Elfring, 2002; Drejer, 2004; Sundbo, 1998; SIC, 1999; Gallouj, 2002; Tidd and Hull, 2005; Edvardsson et al., 2000; Gallouj and Djellal, 2010): Service innovation is very often incremental (Abernathy and Utterback, 1978) and based on practical experiences; very few service firms have R&D departments, service innovation processes have always been open innovation processes (cf. Chesbrough, 2006, 2011). Furthermore, employees, managers and users are involved in the innovation process and act as organizational entrepreneurs. External partners may also be involved (Boden and Miles, 2000; Pinchot, 1985; Kanter, 1983; Kristensson et al., 2004; Tether, 2005; Tether and Tajar, 2008; Sundbo, 1998, 2011; Sundbo and Toivonen, 2011). Often there is no specific budget or formal responsibility for innovation activities, which are carried out as an activity in addition to employees' and managers' normal tasks (Sundbo 2013). The outcome of innovation is economic (increased turnover or profit), but also derived social effects.

The theoretical problems of the measurement of service innovation have been discussed (Drejer, 2004), as have the methodological aspects of measurement itself (Djellal and Gallouj, 2001). Some attempts have been made to measure input and innovation capabilities in service companies (SIC, 1999; Djellal and Gallouj, 2001; INNO-Studies, 2004). New contributions have identified and measured some dimensions of dynamic capabilities in service innovation (den Hertog, 2010; Damvad, 2011; Janssen et al., 2012). Other contributions have developed insights on employee innovation (Sundbo, 1998; ICE, 2010) and the soft (social, organisational) side of service innovation (den Hertog et al., 2006) and involvement of users and other external actors in innovation networks (Sundbo and Toivonen, 2011; Kristensson et al., 2008; Fuglsang, 2010), however, these are rarely based on quantitative measures. Suggestions for indexes that include employees' corporate entrepreneurship and management capability exist (e.g. Sundbo, Fuglsang and Larsen, 2001; Bryson, Rubalcaba and Strom, 2012), however these are few and not very well developed. This has led to the inclusion of new indicators in CIS to capture specific characteristics of service innovation. However, all these attempts are still insufficient to measure all aspects of service innovations and innovation processes.

One may conclude that most measurement instruments and indicators are dedicated to measuring innovation inputs: service firms' innovation organisation, management and general investment in R&D activities (with the latter as a dubious measure of innovation effort in services) or what can be called innovation capability (cf. Teece and Pisano, 1994). A review of measurement instruments (Damvad, 2011) shows a series of such indicators. The measurement of output and of the innovation processes is rare and incomplete.

Further, the measures generally emphasize the macro level. They are attempts to find inputs and outputs at a national level. This is for example the aim of the CIS. Such macro level measures, despite their utility for policy makers, have little relevance for enterprises. They can use them for benchmarking themselves to other enterprises, which can be of some value. Recently suggestions for the most relevant macro or industry benchmark indicators for services have been published (Damvad, 2011, 2013). Enterprises not only need benchmarking instruments, though of course they are useful in a competition perspective. They also need instruments that can help them in their innovation management by sorting out which innovation ideas would be the best in the sense they have the highest probability for successful development, market success and producing an economic surplus. The selection process of service innovation ideas has been described as a funnel in which the management, in successive steps, selects ideas that should be developed (Sundbo, 1998). This demands measures that can inform us about the economic (i.e. resources) inputs and the outputs, which can both be some that can be measured in hard economic terms and some that can not (e.g. increased employee motivation and increased customer loyalty). Such micro measures hardly exist within services.

There has been a focus on customer involvement in service innovation processes, called co-creation (e.g. Prahalad and Ramaswamy, 2004; Kristensson et al., 2004; Kristensson et al., 2008) or co-innovation (Sundbo et al. 2013). This aspect is valuable for creating successful innovations, but also costly because it requires time where employees or managers interact with customers or analyses customer data. Much literature has praised the outcome of co-creation activities and some literature also refers to its measurement (Li et al., 2009; Perks et al., 2012; Gustafsson et al., 2012; Edvardsson et al., 2012). However, such measures are of customer satisfaction with the delivery of existing services. Very little literature has attempted to measure the outcome in terms of innovations, in particular there have been few attempts to establish quantitative measures (some of the rare examples are Li et al., 2009; Perks et al., 2012). This is also true of required input in relation to customer co-innovation (Sundbo, Sundbo and Henten, 2014).

4 What to measure?

Since no appropriate measure that firms can use to assess different innovation projects exists, one may turn to what the service innovation research says about the drivers of innovation processes and the useful outcomes of such processes for service firms. This can be basis for an ideal model of a measure of service innovation efficiency. A review of the

service innovation research (e.g. Sundbo, 1998; Evangelista, R and Sirilli, G. 1998; Gallouj, 2002; Sundbo and Gallouj, 2000; van den Aa and Elfring, 2002; Drejer, 2004; Kristensson et al., 2004; Tidd and Hull, 2005; Hipp and Grupp, 2005; Edvardsson et al., 2006; Gallouj and Savona, 2009; Gallouj and Djellal, 2010; particularly Howells, 2010; Sundbo and Toivonen, 2011; Rubalcaba et al., 2012; Perks et al., 2012) suggests that a broad measure is desirable including both quantitative indicators and qualitative factors that are difficult to quantify. This also suggests that it will be extremely difficult to create one index that contains all input or all output factors. How to characterize the result of the innovation process has been discussed (Damvad, 2011) – whether it should be in terms of output or outcome. The first is considered a more quantitative, narrow income or profit measure, which may usually be expressed in money terms. The latter is a wider measure that includes more than the narrow economic income. Outcome will therefore be chosen here.

A summary of the above mentioned service innovation research literature that has been carried out by the present author suggests the following factors are relevant input and outcome factors:

INPUT FACTORS

These are investments in either money or time (the latter can in principle be converted into money terms).

- *Working hours within the firm* (at all levels and including all activities such as interacting with customers in co-creation activities (Prahalad and Ramaswamy, 2004; Payne et al., 2008; Wittell et al., 2011) converted into money terms)
- *External advice and knowledge procurement* (which can be both expenses, for example consultancy or paid research)
- *Expenses for technology and other materials*
- *Public support* (an income, for example public grants or researchers giving free advice)
- *Network benefits* (e.g. competitors who are also collaborators, representatives from the value chain and others from networks; the input from network activities are normally free, however the firm's time use in network activities should be deducted from that) (cf. Hakonsson and Snehota, 1989; Pyka and Küppers, 2002).

OUTCOME FACTORS

Four types of outcome factors are seen as important in the literature: Income and growth (including productivity), employee factors (such as motivation, competence), customer/market factors (such as branding, experienced customer quality) and strategic/business model (cf. Osterwalder and Pigneur, 2010) changes.

Income and growth

- *Turnover* (more sales – increased turnover)
- *Profit* (either positive or negative)

Employee factors

- *More employees* (an indicator of growth – may be a power factor for departmental managers)
- *Productivity*
- *Employee motivation and competence* (more satisfied and efficient employees)
- *Employee entrepreneurship* (employees more engaged in innovation activities)

Customer/market factors

- *Increased service quality and customer satisfaction* (which in the theories are supposed to be connected, cf. Edvardsson et al., 1994; Grönroos, 2000)
- *Branding and PR* (the firm becomes better known by the market because of the innovation)
- *Penetration on new markets* (a new product launched on a new market can result in firms being able to sell other services in that market)

Business model factors

- *Organisational learning* (the firm learns how to innovate better and more efficiently next time)
- *Changed strategy* (the firm may change to a more appropriate strategy because of the innovation)
- *New networks* (if the innovation required a relation to new external actors, these can be an innovation resource in the future)

5 Practical usability

This theoretical model was tested for its practical usability in a group of 11 innovation managers (of which some were the managing directors) from different service industries and size of service firms²⁵⁰. Three researchers held discussions with this group for a period of one year. The aim of the discussion was to find which input and outcome factors were meaningful to the innovation managers in their business activities, and which measures were appropriate, i.e. some that they would carry out in their firm as tools to assess and choose between different innovation ideas. Thus these measures are also tools in organisational learning (cf. Senge, 1990; Argyris, 1992).

The researchers made notes during the meetings to collect information. These notes were analysed and systematised by the researchers and the results of this analysis were discussed with the group.

One general result was that none of the firms made an exact economic calculation of the total cost-benefit of the innovation processes. Some of the larger ones, and the consultancy firms, registered the number of man-hours used; they could easily find these data and some of them used them. However they rarely learned from them, i.e. they rarely compared them with the outcome and did not compare different innovation projects. They all, in general, expressed that more comprehensive and exact measurements, possibly converted into money terms, were not very interesting to them – they considered this theoretical, desktop, research. They would prefer to use their sparse resources on developing and improving the organisational processes, customer interaction and market knowledge instead of using them on measurement exercises. This may be an effect of a particular national corporate culture. Danish corporate culture is characterised by little formality and an emphasis on practice-based entrepreneurial behaviour, not a big planning approach (cf. Hofstede, 1991; see also Sundbo, 1998 on Danish service firms). The results may be different in for example the USA, France or Germany, which are more dominated by a systematic planning approach (cf. Hofstede, 1991).

Having said that, the managers found all the above factors interesting, however, the outcome factors remained more interesting than the input ones. The managers agreed with what the literature says (e.g. Djellal and Gallouj, 2008), namely that the exact economic effect of innovation attempts is difficult to measure. This is because the effect on profit in particular, but also turnover, can be difficult to isolate from other factors' effects, for example business cycles. Measurement is also difficult and resource demanding in an individual firm thus the advantages of such a measure often does not match the costs of measuring. Those were two arguments given by the managers for not being very interested in the wide range of factors included in the list above. The managers were interested in all the factors, though to different degrees in different firms.

6 Explorative experiments in two service firms

The next step was to make experiments in two selected knowledge service organisations (so-called KIBS). One was a large public organisation (here called 'Tax' – a Danish tax authority), the other a small consultancy firm (here called 'Consult'). The public organization considers itself a service organisation and wants to be innovative hence its relevant for the current purpose. The experiments were explorative as they should investigate the research questions in practice, i.e. which measures are meaningful to the firms and which measures are practicable. The experiments much depended on what the firms, in their actual situation, wanted to do. The answer to that was established and not necessarily very much. This was, from a scientific point of view, not very satisfactory because it did not lend itself to a perfect test of the hypotheses. On the other hand it was an empirical-inductive test of service firms' interest in investing resources in measuring innovation input-output, which also is an aim of this research.

6.1 Method

In each firm we started with a meeting with the innovation managers (who in Consult's case was the owner). We suggested our plan for an ideal measurement and they responded by saying what they thought was practicable and what they wanted to measure, which was not the whole range of factors in the above list. Thereafter they collected data concerning existing innovation activities or developed new measurement activities for a period of six months. The data was connected to a few concrete innovations that were under development at the time. The researchers met the innovation managers and other employees regularly during the data collection period. At the end of the period the researchers and the innovation managers met for a final evaluation of the experiment. The agenda of these meetings was: 1. How did the measurement experiment go – was it carried out as planned, and if not, why not? 2. What was the result, i.e. which values of the input and output were measured? 3. Is it possible to make a quantitative or mixed quantitative-qualitative calculation of the innovation result, i.e. output minus input) (ideally an index)? 4. How do the innovation managers assess the experiment and the results, i.e. are the results useful to the firm and will the firms use them in the future? The next two sections briefly explain the innovations and the measurement activities in each firm and discusses the answers to the above four questions discussed.

²⁵⁰ Members of the group were innovation managers from: A building society, a film producer, a post company, a tax authority organisation, a bank, two small consultancy firms, a film distributor, a large manual service firm providing cleaning, catering, building facilities management etc., a hotel, and a financial IT-advising organisation.

6.2 Tax

One innovation was selected, namely the development of a service letter to entrepreneurs who had abandoned their business and who should be reminded of declaring their income over the last year of the firm's existence. This was a new service. The letter was developed and a test distribution was made before it was finally sent.

At the first meeting an agreement was made about measures of innovation in- and output variables. The outcome variables were to measure how much this particular innovation contributed to outcomes that were considered important by Tax. The variables were:

INPUT

Working hours (salary costs) for development of the activities

External consultant

Letter prototypes – expenses for printing, working hours

Telephone calls (reminders)

OUTCOME

Direct effect ("income" defined as the number of self-declarations)

Saved costs (fewer cases where Tax should calculate the debt– hours with saved salaries)

Branding (the clients found the innovation a good idea – measured in a survey)

Clients' satisfaction with the innovation (the reminder letter) (measured in a survey)

Clients' general satisfaction with Tax (measured in a survey)

Employee satisfaction (interviews, survey)

1. How did the measurement experiment go?

All the agreed measurements were carried out except the interviews and survey output measure of employee satisfaction. In the final evaluation meeting, the innovation manager still found this a very important factor, but Tax had not made the interviews (except a couple of test interviews) and the survey. This was because answering a survey would require some work by several employees and the time needed would be taken from their normal work. This was not so popular, neither among the employees nor the managers in different departments, particularly since Tax was undergoing budget cuts and employees were being sacked. We might conclude that employee satisfaction is considered an important output variable, but measurement can be very sensitive. The service firm may, as in this case, prioritise productivity and internal peace over innovation aims.

2. What was the result?

Tax could measure all the input variables in money terms (for example by measuring hours used on the specified activities). A total measure in money terms of the investment in the innovation could be established (which in this case was 12,000 €). Of the output variables only the direct effect and saved costs could be measured in money terms (which was 13,700 €).

3. Can we make a quantitative or mixed quantitative-qualitative calculation of the innovation result?

Already, based on the above two variables, we can establish that the innovation resulted in a surplus. The branding and clients' satisfaction was measured in a survey. There were no significant effects of this innovation. The total result – excluding the effect on employee satisfaction, which was not measured, was the surplus of 1,700 € though of course there was much uncertainty about the result. The innovation manager emphasized that the costs of measuring the variables were not calculated. If they were, it would probably lead to a deficit, particularly if the employee satisfaction measurement had been effectuated.

4. How did the innovation manager assess the experiment and the results?

The manager thought that it was an interesting exercise that could be used in her actual and future jobs. She wrote an article and made speeches about this experiment and the model. However, she was soon sacked and the innovation department closed down in a rationalization round. Thus to Tax the experiment and the results were not that important, or at least they did not want to invest in a specific innovation department.

6.3 Consult

Three innovations were selected. One was "Competencies on i-pad", a service system which provides information about labour force competencies, which can be used by firms, unions and public employers. Another was "Employment Indicators", which is an information system about the degree of employment and unemployment in different industries and geographical areas; customers are the municipalities, unions, employers' associations and analyse bureaus. The third innovation was "My Doctor Friend", a system to find disease diagnoses on the Internet; customers would be all citizens.

The innovations were already in progress when we, the researchers, became involved. At the first meeting we agreed on the following measurement variables which the firm should attempt to collect:

INPUT

Investment in the innovations (man hours where a total price could be estimated)

OUTCOME

Income and surplus (in money terms)

PR

Improved network relations to customers

Increased service quality

Increased personnel motivation

Increased personnel competencies

1. How did the measurement experiment go?

The counting of investment in working hours in money terms was quite easy because of a system in which all employees register their hours. The outcome was difficult to measure. The firm did not have any quantitative measures and had no interest in developing and using such ones. The owner explained that it would be expensive and saw no need for doing this. It is a small firm and he knows the employees and the customers. Thus, the measurement of the outcome was achieved by calculating the income in money terms from these innovations and interviewing the owner and two of the employees.

2. What was the result?

The financial investment was calculated. The economic outcome was partly calculated, and partly qualitatively assessed by the owner. The researchers made interviews with the owner and two employees, which were the basis for a qualitative assessment of customer and employee effects of the innovations.

3. Can we make a kind of quantitative or mixed quantitative-qualitative calculation of the innovation result?

The investments were 13,400 € in “Competencies on i-pad”, 47,000 € in “Employment Indicators” and 8,700 € in “My Doctor Friend” (all during working hours). The economic benefit of “Competencies on i-pad” was estimated to be small as the turnover of this product was small; no exact figures could be found. The outcome of “Employment Indicators” was quite high; the innovation led to an increased turnover of about 1.2 mio € and it was basis for a public development grant of 2 mio €. Although the exact profit could not be measured, the owner saw it as a clear surplus. “My Doctor Friend” was not sold at all thus all investments resulted in a deficit.

The interviewees expressed that the firm had benefitted from the innovations in the following ways: Strengthen their network with customers, increased employee competencies and a clearer customer interface in IT-base service deliveries. These were positively assessed but no monetary value could be placed on them.

4. How did the innovation manager assess the experiment and the results?

He thought the experiment was interesting, but he was not sure of how useful it really was. As an entrepreneur, he was more occupied by creating job and customer satisfaction than in performing comprehensive calculation systems.

7 Conclusion and discussion

From this research we can conclude:

- It is possible to construct reasonable measurement instruments based on theoretical and empirical scientific knowledge. However, they become compound and can not reasonably be combined into an index.
- Service firms can measure the relevant factors although a few of the factors would be difficult and expensive to measure and they have not been part of this measurement attempts (e.g. network benefits, productivity, branding and PR, and organisational learning)
- The service firms were not extremely interested in developing and using the – seen from a theoretical perspective – “perfect measure”. They assessed that the utility of many measures does not always justify the use of the resources necessary to measure them.
- The most important factors for the firms (which interested them and which demanded limited resources to measure) were:

INPUT FACTORS:

- Working hours within the firm
- Expenses to technology and other materials
- Public support

OUTCOME FACTORS:

Income and growth

- Turnover

Employee factors

- Employee motivation and competence
- Employee entrepreneurship

Customer/market factors

- Increased service quality and customer satisfaction

Business model factors

- Changed strategy
- New networks

It was quite surprising that the service firms were not more interested in using quantitative measurement instruments (and not more intensively focused on profit measurement). Some of them, particularly those in the financial services sector, used measures (particularly of man-hour input), but not very detailed ones. They were more interested in directly creating customer satisfaction and employee engagement than in technicalities in quantitative measurement. This preliminary piece of research shows that at least some service firms are more dominated by entrepreneurial trial-and-error than of a systematic quantitative scientific approach. This may be suggested as a general hypothesis for the service sector.

The issue of quantitative service innovation measurement requires more research to conclude about service firms' attitude and which factors should be included in a measurement. The firms may also accept measurement instruments if researchers present a fully developed use and which they find relevant for their way of handling their businesses. one based on what is fairly easy, which demands few resources, for service firms to

For the evolutionary economic science, this research demonstrates two things. First that the validity of the positive innovation dogma – that innovation leads to economic growth and thus the more innovation, the better – may be more dubious than often assumed, particularly in the large stream of recent literature that focuses, often one-sidedly, on the successful innovations. If we extend the innovation concept to include more than formal R&D – for example service innovation, which normally is not R&D based, open innovation etc. – we know much less about the total innovation input and outcome in the society than assumed. Second, it is difficult to create a reliable and valid measurement of all innovation activities. Theoretically we should therefore have a more balanced discussion of whether, or at least in which situations, innovation is good for the economy, firms and the society. A few attempts at such a discussion can be found in the literature (Fuglsang, 2008; Daly, Sætre and Brun, 2012; Alvesson and Spicer, 2012), but this is only a start.

For firms this research can provide a suggestion for a quite simple measurement instrument that both is research based and practically useable. This should be further investigated in practical experiments in firms.

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The Role of Design in Service-dominant Logic

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This conceptual paper presents the main differences in design and engineering –originated design thinking discourses. Based on the foundational premises of service-dominant logic, a common value creation network and a reciprocal role of a customer can be distinguished in both of the design thinking discourses. The findings widen the theoretical aspects of service-dominant logic into the design thinking area while contributing to the timely discussion of the use of design thinking in value-creation networks.

1 Introduction

This conceptual paper examines engineers' and designers' different perceptions to design thinking based on their cognitive style, and social and cultural interests through the perceptual lens of service-dominant logic. The purpose of this study is to present the differences in two design thinking discourses, engineering and design based, and show how service-dominant logic can bridge the two in a way that benefits them both. Engineers' approach and mind-set are in sciences and the natural world (Cross, 2008), and they perceive design thinking differently from designers, whose approach is based on being empathetic, intuitive, imaginative and idealistic (Neumeier, 2009). As a compliment of being 'scientific' or 'artistic', perception of a service includes one or many human experiences, which are subjective and can mean different things to different people. In today's complex and dynamic markets, it is important to have a mutual understanding of the mode of operation and goals in any collaborative work, for co-creation is largely about communicating with stakeholders, including customers, in order to understand their current and future needs (Gustafsson et al., 2012).

Service-dominant logic views social and economic exchange phenomena (Vargo and Lusch, 2008). It interprets and presents them so they can potentially be understood more clearly. This paper aims to find answers to the following questions: How does engineering design thinking differ from design thinking cultivated by designers, and how could service-dominant logic bridge and clarify the two schools of thinking?

The desire to "scientise" design started in the 1920's in conjunction with technological development (Cross, 2001). Design thinking research, based on design research from the 1960's, approaches designers mode of operation with a positivist view (Schön, 1983), yet acknowledging that design is a highly complex and sophisticated skill (Lawson, 1980). Herbert Simon's work "the science of the artificial" (1969) is even today referenced by many researchers as Simon started the development of "a science of design" in the universities (Cross, 2001). The design research has shed light to the understanding of design ability, which is currently more mature, informed and enlightened (Cross, 2011); even non-designers are able to understand the nature of design ability. Design thinking has been defined many times due partly to its over thirty years long history and researchers various interests. The research has mainly focused on either design -oriented (e.g. Cross, 2001; Norman, 2007) or management –oriented (e.g. Buchanan, 1992; Kelley, 2001; Dunne and Martin, 2006; Dorst, 2011) discourses (Boland and Collopy, 2004). Design thinking has also been viewed from innovation, customer experience and brand value (e.g. Lockwood, 2010) and information technology (e.g. Brooks, 2010) perspectives.

Design thinking is a reflective conversation (Schön, 1983). It has become a new paradigm for dealing with problems in many professions. Although the current research has "scientised" design and interpreted the design thinking from many angles, it has not tried to shed light to how designers and engineers perceive the design thinking concept nor how to align designers' and engineers' design thinking. This paper proposes that the two design thinking discourses, despite of their different perspectives, are complementary and can together create better and more feasible end-results based on the premises of service-dominant logic, which state that value is context specific, uniquely and phenomenologically determined by the beneficiary, i.e. customer experiences.

2 Service-dominant Logic as a Paradigm

Service-dominant logic is an organizing framework created to understand economic phenomena with a wide perspective. Service-dominant logic defines service as an application of operant resources, i.e. knowledge and skills (Vargo and Lusch, 2010). The logic implies that all social and economic actors, such as companies and stakeholders, are service-providing and value-creating enterprises. From design thinking perspective, the most relevant foundational premises (FP) of service dominant logic (Vargo and Lusch, 2008) are presented below.

Operant resources are the fundamental source for competitive advantage (FP4). Operant resources, i.e. people's knowledge and skills, create desired changes which drive competition.

The customer is always a co-creator of value (FP6). Creation of value is done in interaction with others.

The enterprise cannot deliver value, but only offer value propositions (FP7). Companies do not create and deliver value independently, but they offer the competences for value creation, which is done in collaboration with the customers using the value propositions of the company.

All social and economic actors are resource integrators (FP9). Value creation is done in different levels of dynamic networks.

Value is always uniquely and phenomenologically determined by the beneficiary (FP10). Value is context-specific and experimental, and it includes a meaning to a customer.

3 Design Thinking as a Paradigm

In this paper, design is defined as “the optimum solution to the sum of the true needs of a particular set of circumstances” (Matchett, 1968), and design thinking as a mind-set, a methodology and an innovation process which “applies a designer’s sensibility and methods to problem solving, no matter what the problem is” (Lockwood, 2010). The basic assumption is that everyone is capable of designing (Papanek, 1972), and design thinking is inherent within human cognition as part of what makes us human (Cross, 2011).

3.1 Engineering Design Thinking

Engineers deal with “hard” knowledge of science, and roots of their mode of thinking lay in the Technical Rationality which is the heritage of positivism (Schön, 1983). According to positivism, propositions need to be either analytically or empirically testable, otherwise they are meaningless. “Rational behaviour” includes guidelines that outline a systematic procedure of first analysing the problem, then breaking it into sub-problems, finding suitable sub-solutions, evaluating them, and selecting a suitable combination of the sub-solutions as the overall solution (Cross, 2011). In design thinking, engineers stress what is necessary considering materials, mechanisms, structures and systems (Buchanan, 1992).

3.2 Design Thinking Originated by Designers

Designers’ work has a starting point in the “soft” knowledge of artistry and unvarnished opinions (Schön, 1983). They explore and generate solutions, and for them an understanding of a problem is tightly integrated with the synthesis of the design process whereas a scientist’s, a non-designer’s, approach analyses first the problem, and creates only after that the synthesis (Lawson, 1980). Design concepts can be designers’ personal insights, which emergence as a result of some considerable cognitive effort (Cross, 2011). In design thinking, designers stress what is possible in the conception and planning of the artefacts (Buchanan, 1992).

In the next chapter, the two design thinking discourses, engineers’ and designers’ legacies, are interpreted through a lens of service-dominant logic. The arguments are exaggerated in order to pinpoint the different perspectives the discourses have although the characteristics are more mixed in reality.

4 Design Thinking through the Lens of Service-dominant Logic

Service-dominant logic and design thinking are not theories but mind-sets (e.g. Kowalkowski, 2010; Dunne and Martin, 2006). They both have an objective to involve people in an integrative and collaborative process, and bring products, services, and experiences to the market (e.g. Lockwood, 2010; Vargo and Lusch, 2008).

Figure 1 illustrates the common nominators of engineers’ and designers’ design thinking discourses from the perspective of service-dominant logic. Human-centricity is a corner stone in design thinking, and the emphasis is on observation, collaboration, fast learning, visualization of ideas, rapid concept of prototyping and concurrent business analysis (Lockwood, 2010). According to Gilbert Ryle (2009 [1949]), designers aim to “know how” phenomena and activities take place. Data in the engineering design process can be presented in the form of propositions as “know that” (ibid.). The design culture views the world through practicality, ingenuity and recognition of emotions experienced by other people while concentrating on “appropriateness” whereas the culture of science values objectivity, rationality and neutrality while aiming at being the “truth” (Cross, 2008).

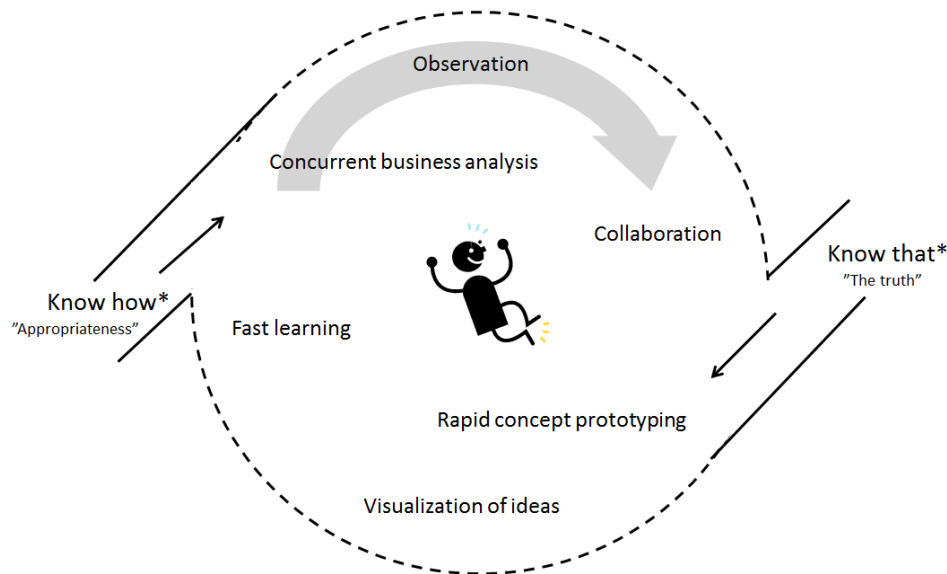


Figure 1. Design thinking is a human-centered methodology and innovation process. The concepts “know how” and “know that” are adopted from Gilbert Ryle (2009 [1949]).

In the following sub-chapters the main differences related to value, mode of thinking, focus, customer understanding, perception of time, scope, quality, and expectation management, of the two design thinking discourses are presented, and the lens of service-dominant logic is used to bridge the discourses together.

4.1 Value

Engineering design thinking is cultivated by multiple engineering disciplines where the natural world and sciences with logical thinking and mathematical facts are seen as the foundation. Engineering design thinking values objectivity, facts and sense making (Cross, 2008, 2011). Designers do not forget science, technology and art but keep them in the background (Lawson, 1980) while concentrating on subjectivity and understanding of the social and emotional aspects of the customer (Cross, 2008). The solutions designers provide do not have right or wrong answers.

According to service-dominant logic, the value is phenomenologically determined by the beneficiary, i.e. customer, in a social context of networks, and the operant resources (knowledge and skills) create the fundamental basis of it (Vargo and Lusch, 2008). The created value is unique to a certain situation and context (Vargo and Lusch, 2010).

4.2 Mode of Thinking

Design thinking can be inductive, deductive and abductive; abductive thinking being the necessary logic of design (Cross, 2011). Engineers apply the design thinking methodology to problem solving from a starting point in the scientific theory and technique. Mode of thinking is mostly inductive and deductive, and each step in the process is a logical continuation of the earlier acquired knowledge and experience based on available facts (ibid.). Designers' mode of thinking is inductive, deductive and abductive. Dorst (2011) divides abductive thinking into two forms; abduction-1, problem solving, refers to a process where an object that will give definition to both the problem and a solution space is missing. Abduction-2 refers to a more complex process where only the aspired end value is known. Engineers and designers use abduction-1 (ibid.). Abduction-2 is used in latent problems that are not apparent, and it is closely associated with design (Roozenburg and Eekels, 1995). The use of intuition, a leap of faith (Martin, 2009), is difficult to justify for an engineer without facts and evidence (Cross, 2011).

According to service-dominant logic, companies can only offer value propositions, and value is determined by the beneficiary (Vargo and Lusch, 2008), so the value of customer experienced could be a sufficient evidence for an acceptable proposition instead of pinpointing complex mathematical formulas or possible discontinuations in the thinking process. Realization of value requires that an input from a single provider needs to be integrated with other resource (ibid.).

4.3 Focus

Engineering design thinking focuses on solving problems (Lawson, 1980). A general rule of thumb in the engineering organizations is “do not fix it, if it is not broken”. Engineers divide a problem into smaller entities and focus on solving a sub-problem piece by piece (Cross, 2011). Designers focus on finding solutions to problems that might not even exist (Lawson, 1980). Finding a solution to an undefined problem forces designers to focus on the problem setting, too (Schön, 1983). For designers, the problem and the solution are intertwined and developed together. During a design

process, relevant features can emerge in tentative solution concepts and by being recognized, they can have properties that are used in solution-concept or problem-concept or both (Cross, 2011).

According to service-dominant logic, a customer is always a co-creator of value (Vargo and Lusch, 2008), so the focus of design thinking could be shifted to the perspective of service exchange and collaboration of relevant actors since the operant resources are the fundamental source of competitive advantage.

4.4 Customer Understanding

Engineers' approach to solving a problem is technology –oriented and customers' needs are fulfilled with advanced technical applications. A new technological artefact or service is delivered with a thick manual, and the customer is expected to read the manual before using or experiencing the new solution. Designers approach customers ethnographically; they prioritize a customer, and the outcome of the work is based on meanings (Lockwood, 2010). Customers should feel a pleasure when using an artefact or experiencing a service. Designers can also jump to a conclusion already in the early phases of the process (Cross, 2011), rather than being more objective and generating and evaluating many possible options for the solution.

Based on service-dominant logic customers are resources with whom value is co-created reciprocally by using the operant resources (one's competences) for the benefit of another party (Vargo and Lusch, 2004, 2008). Service is the fundamental basis of exchange (*ibid.*), so the company needs to understand the customer as well as the customer needs to understand the company in a certain context.

4.5 Perception of Time

Engineers split their work into logical entities based on e.g. a project plan or an operational process. The units of time, such as an hour or a week, create a rhythm to the work; e.g. scheduling of a project is done based on the given dead live for the project launch, which "dictates" reserved time slots for each activity in the project. Perception of time is more challenging to the designers since their approach to possibly even invisible problems and understanding of the problem settings is not necessarily logical or bound to a clock. Therefore there has to be allowance for free-flowing activities within the overall schedule (Cross, 2011). Designers are used to live with ambiguous design proposals, leaving many options open for as long as possible (Cross, 2011). It is quite usual that designers seem not to have enough time to complete their work and they need to be "forced" to the solution.

Service-dominant logic is built on long-term relationships and timeless value-creation networks. It emphasises lifetime value and balanced centrality in the network (Gummesson et al., 2010).

4.6 Scope

Since the Industrial Revolution generous two hundred years ago, engineering thinking has been focusing on mass production. Designer's heritage lays in craftsmanship which has even a longer history. A craft was a profession that required particular kind of skills in designing and making artefacts, which were tailor-made to last for a long time. The different perspectives are reflected in how engineering and design –originated design thinking discourses approach the concept of scope even today; increasing competition in global and local markets, and economies of scale and scope have been included in the engineering thinking whereas designers settle for uniqueness and fit-for purpose approaches.

Service-dominant logic suggests that the value creation takes place within and between networks consisting of economic and social actors who interact with each other and exchange services across and through the networks (Vargo and Lusch, 2008). The scope of the value-creation network constitute of the society and the market.

4.7 Quality

Quality systems and standards have been developed to align and integrate the production of goods and services. Correct level of quality, e.g. right dimension, feature or functionality, is an essential factor in company offerings, and it is based on engineering thinking. Designers approach the quality from solution-finding perspective and perceive quality to be embedded in the solution.

Value has taken over the importance of quality in service-dominant logic (Gummesson et al., 2010). Since customers are co-creating the value, the aim of the companies could be in effectiveness, situational "cleverness", not making efficiency the primary target.

4.8 Expectation Management

Traditional engineering mode of operation has been to execute when a plan is ready and end-result known (Cooper, 1990). Currently the agile working methods as well as focus on radical innovation with fast prototyping (e.g. Lockwood, 2010) are popular in engineering discipline, too. Customer expectations are easily missed in the process due to various reasons, the main one being that customers are not enough involved in the process. Designers are opportunistic; they plan their activities at the same time as they work so the end-result is un-known when the work starts (Cross, 2008). Collaboration is embedded in designers' work (e.g. Cross, 2011) so the involvement of

stakeholders, including customers, is as natural for them as the use of logic steps is for engineers. Designers also challenge norms for example by being roughly ready (Lockwood, 2010), or behave opportunistically for example by deviating from a plan when a good idea comes along (Cross, 2011), which can cause difficulty in the interaction process and create misunderstandings of a customer.

According to service-dominant logic, the value creation is inherently relational and since customers are co-creators of the value, the value creation process is transparent for them. This indicates that the co-creation transactions come with social (and sometimes even legal) contracts with implied warranties which are statements that the exchange relationship yields valuable service provision for an extended period of time Vargo and Lusch, 2008).

5 Conclusion

The importance of customer understanding is indisputable in any company but the notion of customer understanding can vary; an engineer builds technology-oriented solutions based on facts and figures whereas a designer focuses on the customer sentiments and situational setting. Through the perceptual lens of service-dominant logic, the differences of designer –originated design thinking and engineering design thinking can intersect and complement each other (table 1). The wider angle in the common value-creation process and the reciprocal role of customers could give a new meaning to both discourses and that way create richer and more feasible results, where the integration of “know how” and “know that” is more than the discourses put together as independent proposals.

Table 1. Service –dominant logic (SDL) can complement the discourses of engineering-originated design thinking (EDT) and design-originated design thinking (DT).

Main differences	EDT	DT	The bridge created by SDL
Value	Fact-based and logical “truth”, objectivity	Context and situation dependent “appropriateness”	Beneficiary determines the value based on his/her experience
Mode of thinking	Inductive, deductive and abductive (abduction-1) thinking	Inductive, deductive and abductive (abduction-1 and abduction 2) thinking	Companies offer value propositions, and value is created in collaboration with all actors
Focus	Piece-focused sub-solutions to sub-problems	Holistic approach; seeing things in terms of how they relate to each other in producing a result	Service is exchanged for a service in collaboration, operant resources are the source of competitive advantage
Customer understanding	Technology-focused	Ethnographic approach, providing a pleasure to customers	Value is co-created reciprocally with customers by using the operant resources for the benefit of another party
Perception of time	Work is split into time slots based on a plan or mode of operation	There is never enough time	Relational and timeless value creation
Scope	Mass production	Uniqueness	Value creation is done in networks of actors
Quality	Verified by an external party, e.g. standardization	Embedded in the design	Value is more important than design
Expectation management	Customers do not think they are enough involved in the work process	Opportunistic working methods are challenging in collaborative processes	Value creation is inherently relational and customers are co-creators of it

In this paper we focus on the main differences between engineering-originated and design-originated design thinking discourses. The similarities between the discourses, e.g. high levels of concentration and engagement as well as the aim to understand various angles and layers of the problem (e.g. Cross, 2000, 2011; Neumeier, 2009) support the design thinking mind-set and common goal setting. Nevertheless, it would be interesting to study how to “trim” the two discourses in addition to “prune” the factors that prevent successful design thinking from happening. This is a conceptual paper so empirical data are needed to verify, deepen and possibly enhance our preliminary conclusions.

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Regional economic performance discrepancies, spatial distribution of services, and rural development in Romania

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The present paper reports the results of the first phase of a project which final aim is to design service driven rural development policies directed especially toward protected, intermediate and remote rural areas of Romania. The main objective of this phase is to provide a characterization of NUTS 3 regions in terms of (1) economic performance, and (2) presence, structure and localization (concentration) of service activities. Additionally, it is expected that researchers draw some preliminary conclusions regarding specific policy measures, differentiated in correspondence with the local endowment with economic factors and the prospects for economic diversification and market integration of rural areas.

1 Introduction

Romania is divided into 41 NUTS 3 administrative regions regrouped into 8 NUTS 2 regions for statistical and support for development policies purposes, and four NUTS 1 regions. There are 320 towns (out of which 103 larger and better endowed, called „municipiu”) and 2861 rural administrative units called ”commune”. Apart from the municipality of Bucharest and its surrounding areas, the entire territory and population of Romania should be characterized as rural when the analysis regards NUTS 3 or NUTS 2 regions. Six of the NUTS 2 regions of Romania rank amongst the 10 less developed regions of the European Union. However, when looking into more detail, the degree of urbanization, industrialization, the economic performance and growth prospects vary significantly from a region to another, from areas close to cities to intermediate or remote areas. There are important differences regarding the endowment with basic infrastructure, human capital and natural resources. Most of the Romanian rural economy consisting of small agricultural households relies on auto-consumption, barter, and small informal sales. Especially because of this, service driven rural development policies should be designed with the main aim to stimulate, assist and support the marketization, monetization and formalization of the rural economy. Current policies promoting standardized, un-differentiated projects under EU funding are frequently unfitted to local conditions, and so they fail to achieve a spill over effect. The development of an economic typology of Romanian rural areas, which is presented by this paper, provides the grounds for designing a set of differentiated policies.

The paper includes a synthetic presentation of the main lessons from the research in the fields of economic geography and regional economics with a specific focus on services location and local economic impact. A specific section analyses from a spatial perspective the correlation between economic performance, the presence and structure of service activities. Next, in defining and characterizing types of rural areas, the main challenge is the preparation of a consistent data set, from several main sources (National Institute for Statistics, Regional Statistics Offices and Regional Development Strategies, a comprehensive and very detailed database with data at locality level managed by the Ministry of Interior). This work is on-going.

2 Overview of regional disparities in Romania

The study of regional disparities is well covered in the literature. The aim of this section is just to familiarize the audience with the specific situation of Romanian regions.

In terms of GDP per capita, Romanian regions rank among the poorest of Europe. As one may see in Figure 1 (next page), out of 42 NUTS 3 regions, Bucharest and its surrounding area (Bucharest-Ilfov) is the only region with a level higher than 75% of EU average. Four regions match EU average, and these are, from west to east: Timiș (J40)²⁵¹, Cluj (J3), Sibiu (J12), Brașov (J8) and Constanța (J21). Four Romanian regions are mentioned among the five that recorded the highest rate of change of GDP in the last decade (2000-2010), as compared with the EU average (the fifth being Sofia region in Bulgaria) (Eurostat 2013, 26). Interestingly, two of these most dynamic regions are from the top of the Romanian regional hierarchy, while the other two rank still below the Romanian average GDP per capita. This finding it is worth to be noted because it contradicts two positions that are frequently taken by analysts, one saying that growth is easier to achieve when starting from a low initial development level, the other saying that richer regions are better equipped to achieve economic growth. On the other hand, it is a consensus that economic growth is not the same with economic development, and even lesser corresponds with the concept of sustainable development. We do not intend to discuss these distinctions within the present paper, but we need to mention that our approach regarding rural development is primarily focused on achieving cohesion in the functioning of the economy. We intend to bring into light the need for modernizing the rural economy, achieving implicitly sustainable development economic structures.

²⁵¹ J1... J40 are conventional notations used in the present document in order to improve readability for readers who are not familiar with Romanian denominations. Correspondence is provided in Appendix 1.

Seen from EU level Romania appears to be almost homogenously (under-) developed. Two other arguments support this idea:

- Romania is a rural country. Leaving Bucharest aside, Eurostat classifies 23 Romanian regions as predominantly rural (with over 50% of population living in rural communities) and 17 regions as intermediate (20-50% rural population). When looking closer, we see that among the „intermediate regions” eight have a share of rural population higher than 40% and only two a share lower than 30%;
- The average monthly income of the population varies roughly between regions from 22000 lei to 27000 lei, which is considered to be relatively low imbalance.

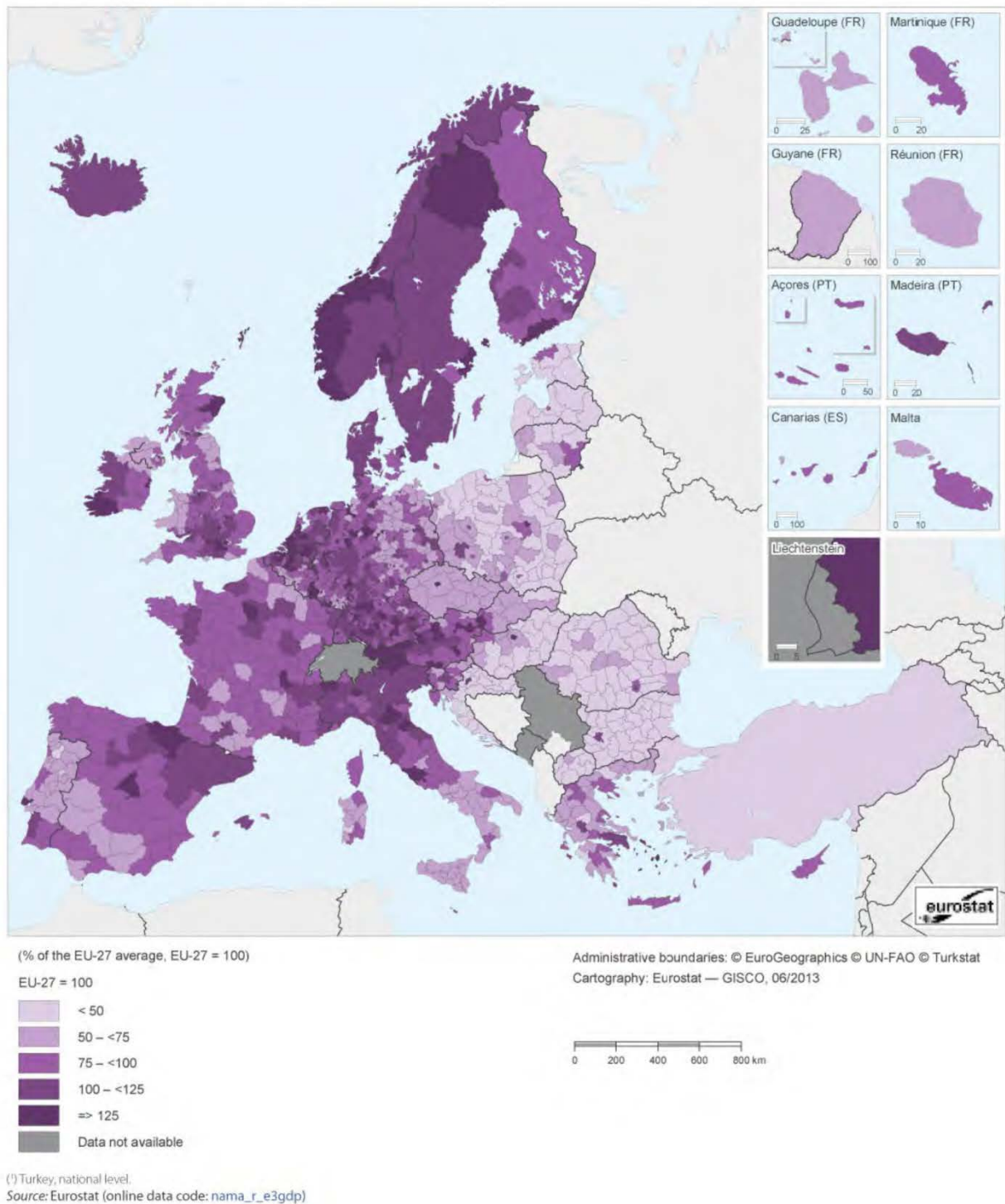


Figure 1. GDP per inhabitant in PPS by NUTS 3 regions in 2010 (% of the EU average)
source: EUROSTAT (2013).

In reality, once we narrow the analysis the regional discrepancies become significant.

In Figure 2 we present the relative position of Romanian NUTS 3 regions compared with the country average. We have eliminated Bucharest and Ilfov (both from analysis and from the average). From this perspective, we put into evidence that GDP per capita is almost double in Timiș than the country average, while for Vaslui the same indicator is with 50% below the national average.

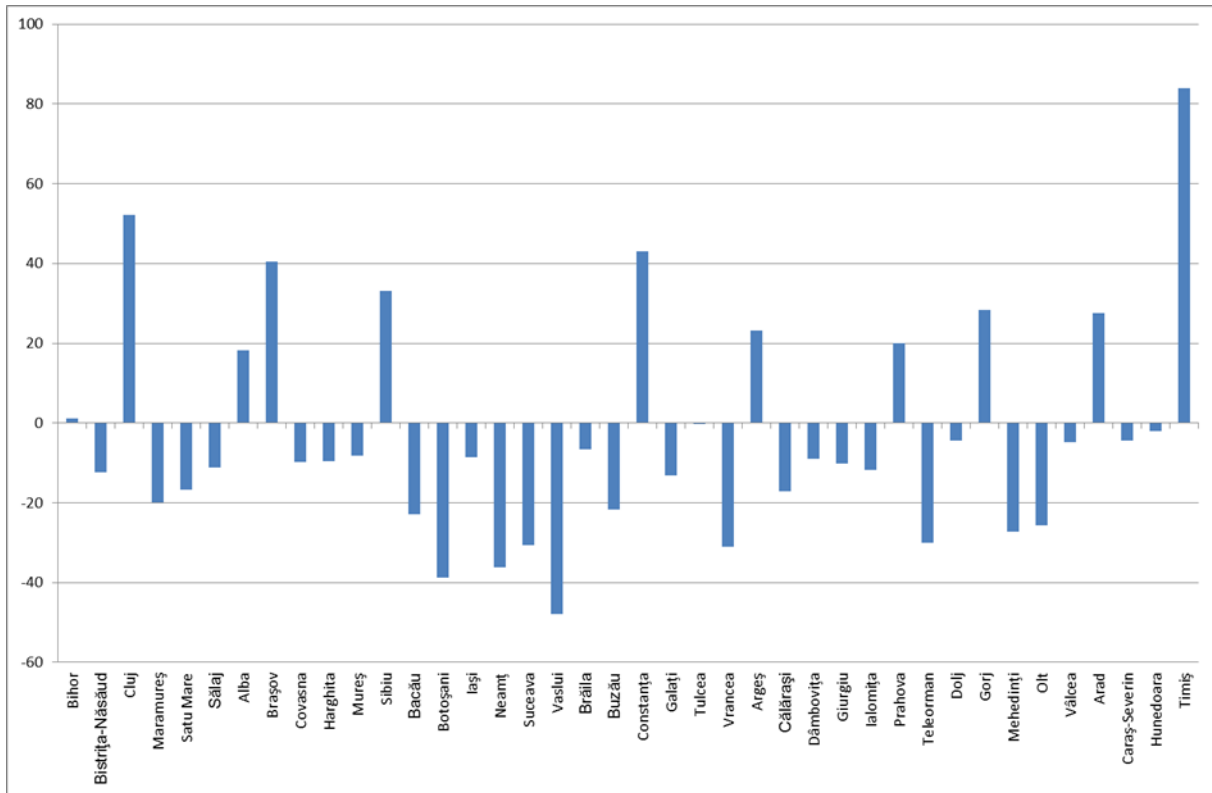


Figure 2. Per capita GDP - % above(+)/below(-) the national average by NUTS 3 regions, 2011, Romania (source: authors calculations, NIS²⁵² data).

The question is if there is any relation between relative levels of economic development as expressed by the GDP per capita on one side and (a) the share of rural population or (b) the contribution of services to the regional Gross added value, on the other.

From the graph in Figure 3 we see immediately the tendency of predominantly rural regions to record a lower economic performance. There are also interesting cases. For instance:

- Hunedoara (J39) is the region with the lowest share of rural population, but has a GDP per capita which is slightly lower than the national average (Hunedoara is characterised by the presence of declining industries);
- Timis (J40) has the highest GDP per capita, but a near average share of rural population. It means that within a modernised economic structure, the predominantly rural character may not be a restriction for economic performance. This is also confirmed by the cases of Dimbovita (J27) and Giurgiu (J28) that are eminently rural but achieve an average economic performance²⁵³.

²⁵² National Institute for Statistics

²⁵³ It is worth to be noted that Timis and Giurgiu are among the most dynamic regions of Europe between 2000-2010

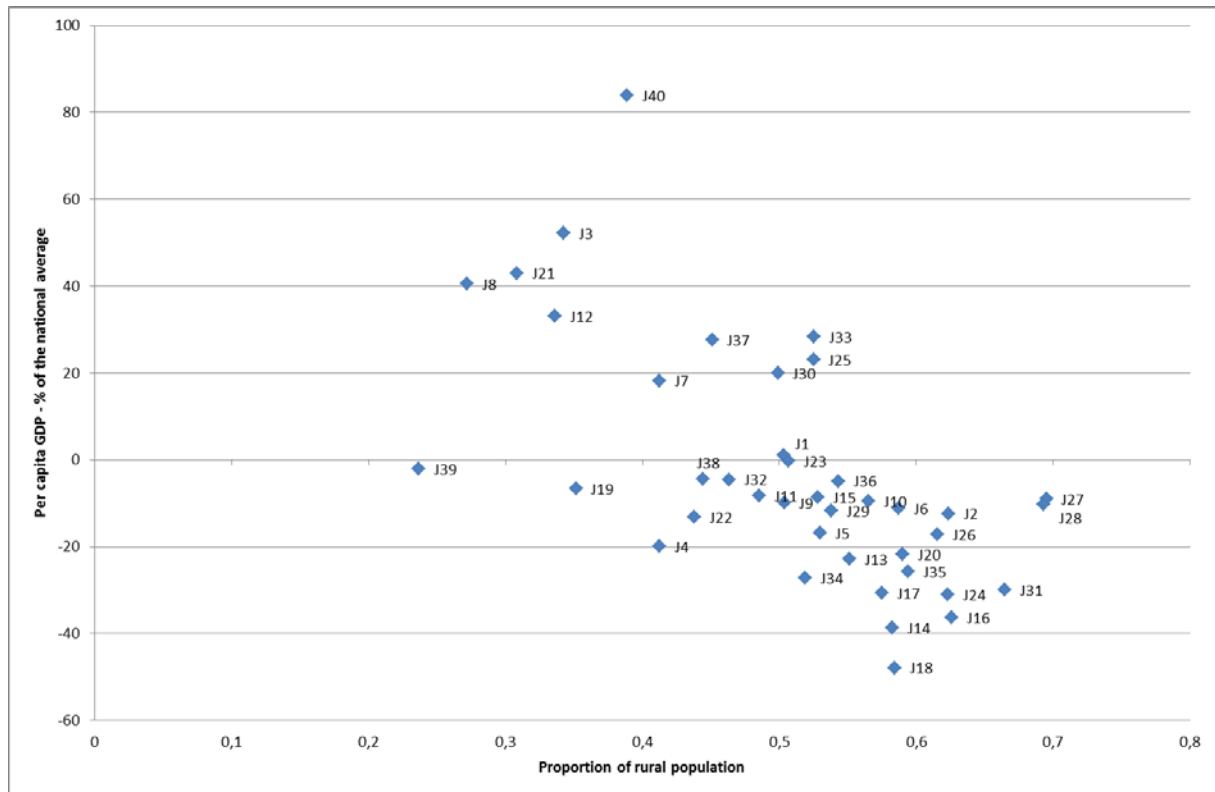


Figure 3. Distribution of Romanian NUTS 3 regions relative to per capita GDP and the share of rural population (source: authors calculations, NIS data).

Quite differently, the distribution of regions according to the economic performance and the contribution of services to GAV (Figure 4) do not show the same linear trend line. Taking the national average as reference, we can indeed identify four clusters of regions:

- NW quadrant, high share of services - low economic performance;
- NE quadrant, high share of services - high economic performance;
- SW quadrant, low share of services - low economic performance;
- SE quadrant, low share of services - high economic performance;

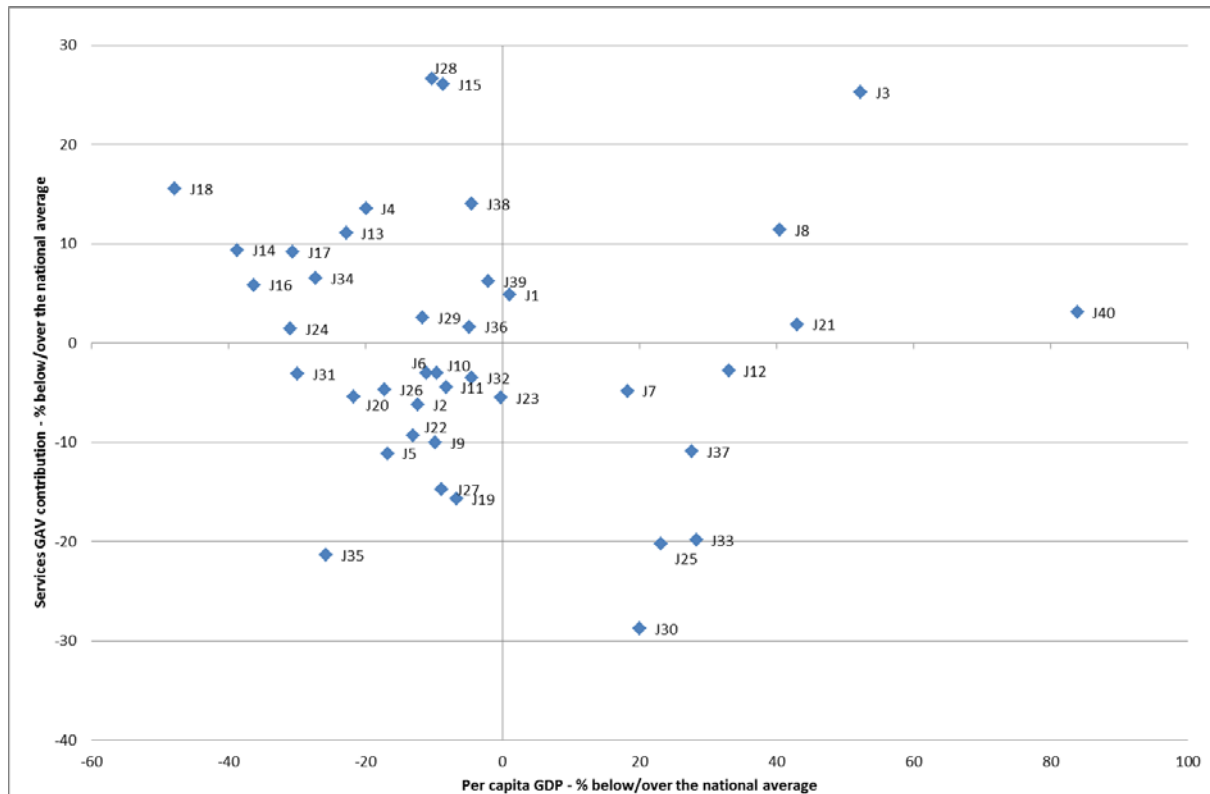


Figure 4. Distribution of Romanian NUTS 3 regions relative to per capita GDP and the contribution of the services sector to GAV (source: authors calculations, NIS data).

Striking, the regions are evenly distributed between North and south quadrants. There are also interesting cases to be considered:

- J18 (Vaslui) is the poorest region according to the per capita GDP, but records one of the highest contribution of the services sector. In fact the highest contribution is made by public services and commerce, while the other economic sectors have a very low output
- J30 (Prahova) is a region with GDP significantly above the national average but with the lowest contribution of services, despite the fact that it is one of the Romanian regions with a well-developed infrastructure for tourism. On the other hand Prahova is also a region with strong industry and construction sectors. This raises, nevertheless a question about the relationship between manufacturing and the business services sector. It suggests that either the manufacturing sector is organised traditionally or it acquires services from elsewhere, in particular from Bucharest given the proximity.
- J3 (Cluj), considered as a centre (core) of the historical region of Transilvania has one of the best equilibrated economies among Romanian regions. Among others it has a strong multicultural university and a well-developed network of education institutions, the most successful industrial park (it was the location of Nokia in Romania but there are many other multinationals still active). It is one of the leading regions in the production of key services as ITC, financial intermediation, professional and other business services, and – not least – cultural activities.

With this brief overview we can draw two main conclusions: first, an important share of rural population is compatible with high economic performance, and second, the contribution of services to the economic performance depends not only on the share of services in the economic output but also on the nature of the services that are produced and their interaction with the other components of the economy.

3 The role of services in the rural economy of Romania

The rural economy continues to be a subject of high interest for researchers, policy makers and other stakeholders. While in developing economies the focus is on enhancing the capacity of agriculture and other traditional activities to provide an economic support for the subsistence of the population, in more advanced economies the focus switches on some other priority themes: acquiring competitiveness, protecting the environment, preserving the cultural heritage, ensuring food security and high living standards for the population. As rural areas exhibit a large variety of particular situations requiring adapted policies scholars are concerned with improving the rural work typology in order to better

address the priorities of different types of rural areas. A very good example in this respect is the work of JRC-IPTS on reviewing EU rural typologies in connection with the territorial impact assessment of policies (Copus, A. & al., 2008). Authors propose a refinement of OECD rural typology by adding a „peripherality” characteristic. It “reflects potential interaction with all economic centres across Europe, taking account of both their size and their relative proximity” and it “is seen as a key aspect of the overall business environment, with a theoretical basis in the concept of agglomerative advantage, (external economies to scale), and affecting both prospects for growth and levels of innovation.” (Copus, A. & al., 2008, 72-73). The value of this work also value of this work lies in providing a comprehensive inventory of methodologies and models that can be used in order to combine rural typologies with territorial impact assessment.

Rural development is a major concern for Romania, a country with 40% of population living in rural areas, with large lagging behind in the endowment of rural communities with basic services and where rural life is in many cases associated with poverty, or self-subsistence in the better cases. A Romanian scientist, Dumitru Sandu has extensively studied both the rural economy and the poverty in Romania. In one of his articles he describes the situation of the Romanian villages in the following way: „ Human capital is the most important component of village development or poverty. An explanation of village poverty is given in terms of poverty cycles and regression models. The poorest villages are peripheral villages within communes, located in plain areas, far from large cities and modernized roads, in low developed judets.” (Sandu, 1999, 138). He has also found that besides the consistent classification of poor and traditionalist villages or modern developed villages, another dimension of cultural nature is present. It defines villages that are relatively poor but which population embraced a modern stile of living in the rural context. Dumitru Sandu also developed a composite index of villages’ development (based on 17 indicators) providing an estimate of the average village development index for each region (NUTS 3) of Romania (Sandu, Voineagu & Panduru, 2009). We are using this index for our work. There are many other researches that address the socio-economic development of Romanian rural areas none of which, to the extent of our knowledge, is focusing on the role – actual or potential – of services.

The only data available at this moment for estimating the service activity in rural areas is the number of employees in services. We took into account all kinds of services, except commerce.

We found an almost perfect correlation between the village development index and the number of employees in services per 1000 inhabitants of rural areas (Figure 5).

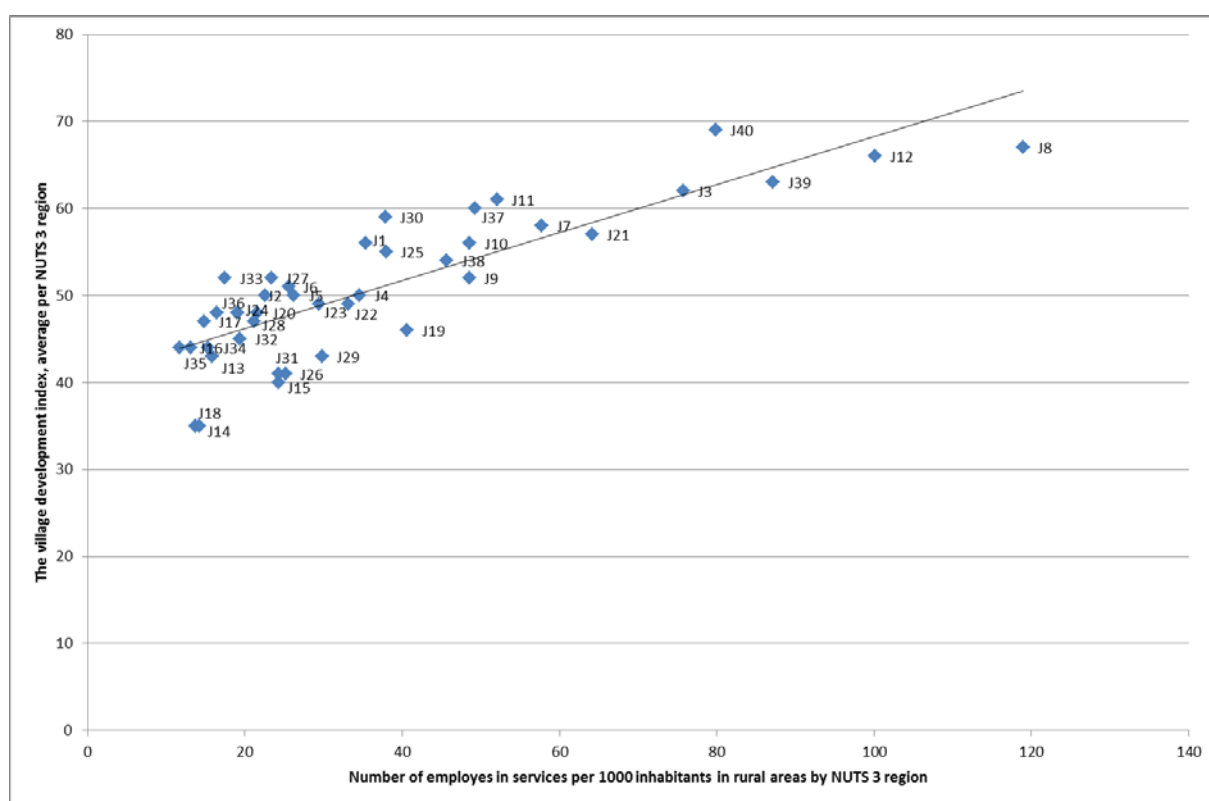


Figure 5. Distribution of Romanian NUTS 3 regions relative to the number of employees in services per 1000 inhabitants and the village development index (source: authors calculations, village development index from Sandu, Voineagu & Panduru, 2009, NIS data for service employees in services).

This correlation is in contrast with the distribution in Figure 4, and the main explanation is that the village development index is substantially different from per capita GDP. It is build taking into account a large number of indicators including housing infrastructure, public finance, household individual capital and human capital at locality level. Therefore, it reflects better a number of qualitative aspects of development.

Once we found evidence that rural development is correlated with the development of services, the issue is that we do not know if revenue from agriculture and other activities provide the grounds for services development, or the presence of services (as a result of either private or public initiatives, or both, induced by cultural patterns) was the factor that supported the development of rural communities.

We had interviews with a number of rural community leaders (mayors). They all suggest, even if in different ways, that it is a problem of perspective. People from communities with a certain level of development, can see an opportunity to improve their own lives. They enter the formal economy to get more, they invest, pay taxes and demand services. Poor communities lack basic services (water, sewage, roads, secondary and sometimes even primary education, health services). This is not an option for people that aspire to a modern life; they are leaving, and those who remain are those who are satisfied with their living, or who do not have the capacity or the means to change anything. Sometimes many people that find a job abroad send money to their families, or come back with their savings and a new perspective. When such a phenomenon rich a critical mass in a particular community, the prospects of that community are improving as well. Maybe this is a partial answer to what Dumitru Sandu identified as a difficult to explain modern culture in poor communities.

Another interesting case is that of a rural locality where public investments were done for water distribution, swage and gaz. Because people had no money, in the first phase few were able to pay the individual branching and the recurrent charges. But others have struggled to get a monetary income and in three years the utility operators were close to their breakeven point. Access to services generates the needed perspective and initiates a virtuous circle that leads to the modernisation of the rural economy. This does not happen in every case, there are also communities in extreme situation where most of the population lives at the level of pure subsistence from social assistance and other public transfers, and their situation will not change soon. It is a totally different subject, which is not related to economic development, but to our responsibility for ensuring that human rights and constitutional provision are respected.

Services are not only a driving force for the modernisation of the economy in poor rural areas. In more advanced rural areas, business services can also contribute at better valorising local resources. People from a locality in the south of the country are seeking to find a distributor to collect their production of tomatoes. In a locality of Sibiu County guesthouses owners are paying for training in foreign languages, marketing and web design services, most of the productive activities need implementation of quality systems and certification, legal advice or technical expertise.

4 Conclusions

The rural specificity is given by the relatively low density of population, wealth of the ecosystem, the horizontal development of infrastructure, the preponderance of occupations related to agriculture, fisheries, timber harvesting and traditional crafts. The vision we propose is that economic activity has diversified to include the features and mechanisms of the modern economy, developing small-scale and clean services and manufactures, ensuring comfort and safety of residents in levels of modern life, but retaining the other characteristics of rural areas.

Compared to the situation in other countries, the villages of Romania retain many characteristics of rurality. Romanian villages are a national asset that must be cherished, preserved and properly exploited in a sustainable manner.

Romanian rural space is not homogeneous. There are a wide variety of situations in terms of demographic, climate and natural resources, and economic potential. There are communes in which the process of urbanization cannot be prevented, as is the case especially near large cities, where many satellite villages have already been functionally integrated into the city. For this type of localities the solution of metropolitan development should be followed with wisdom so that the locality in question does not turn in a poor suburb. Similarly, there are several villages experiencing a resort-type irreversible development; that fact must be recognized and development solutions must reflect this status. However, for isolated communities, deprived of resources, located in areas affected by adverse demographic or climate trends, which bear the consequences of irresponsible human activity in the past, or are seriously affected by poverty, long term support programs should be adopted deliberately, under the principles of solidarity and social cohesion.

Communities have different aspirations and economic changes cause social changes that must be known and deliberately assumed by the members of each community through democratic participation and good governance based on local autonomy.

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Co-designing a collaborative idea-generation model with stakeholders

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Business practices are changing when firms are adopting service business approach as a basis for the operations. Customer centricity and resource integration are among those initiatives requiring new ways of working. This paper reports a case study of an industrial service with a strong strategic implementation supporting service business approach. The empirical data of service development process comes from 13 stakeholding organizations and was collected in various methods. The paper explores the co-design process of a collaborative idea-generation model. The suggested model is based on the Double Diamond model. The novelty of the paper is the stakeholder engagement, which is extended from dyadic two counterpart activity to simultaneous many-to-many collaboration within idea generation phase in service development. The study suggests an approach that may reveal new insights into customer centricity and resource integration research.

1 Introduction

Collaboration during the service development process simultaneously with various stakeholding actors requires attention. Despite the popularity of co-creation, studies focus often on one-to-one collaboration and customer, client or user involvement is common (see Alam 2002, Bessant and Maher 2009, Marasco et al. 2011). There might be other stakeholding actors related to the service, who could be involved in collaboration. This wider stakeholder engagement is still less addressed especially in B2B setting. This paper addresses this shortcoming and extends the discussion to multiple stakeholder collaboration. Further, the paper addresses the influence of multiple stakeholders and the role they also have in developing the collaborative idea-generation model. The paper offers a deeper view on how the model was co-designed.

In service research, studies providing deep empirical evidence is lacking behind the extensive conceptual research. Therefore, this paper illustrates a study, which aimed to focus on concrete real-time activities and empirical evidence for the benefit of the academics and business practitioners.

The purpose of this paper is to focus on contribution of engaging widely both internal and external stakeholders into the idea-generation part of the service development process. Building on empirical evidence, this paper contributes the understanding of stakeholder integration.

Some limitations apply to this paper. It investigates whether the process could be designed by applying service design approach. Following this approach, the paper explores and describes the case and explains how the co-designing of the collaborative idea-generation model took place. The model facilitates and mediates the integration of stakeholders into service development. Although internet and communication technologies (ICT), interactive technologies, and social media provide huge opportunities to engage stakeholders (Ramaswamy and Gouillart, 2010; Russo-Spena and Mele, 2012; Ind and Coates, 2013; Hatch and Schultz, 2010) this case study focused on face-to-face engagement.

The whole service development process needs to be followed through in order to have beneficial value propositions. However, in order to limit the focus of this paper, we elaborate and explore only the idea generation part in this paper. Empirically the paper provides a rich data by studying how participant activities are planned, facilitated, carried out, and analyzed.

2 Framing the joint idea generation approach in service development

The idea generation is studied from the perspective of service dominant logic (SDL) of marketing (Vargo and Lusch 2004). **Customer centricity** and **resource integration** are integral part of the logic and of the SDL literature. In SDL research, one of the main changes has been the question of the ownership of resources leading to resource integration paradigm (Vargo and Lusch 2004, 2008). There is little evidence of resource integration and customer centricity approaches. Yet, truly customer-centric models and multiple stakeholder-driven approaches are yet to be taken into businesses. In B2B context, resource integration has been discussed between one customer and one supplier relationship (den Hertog 2000). Customer centricity is hindered in firms due to the organizational culture, structures, processes, and financial metrics of the focal firm (Shah et al. 2006). In B2B context, and especially in the larger firms, the customer relationship interaction is commonly organized through the key account management system. (McDonald, Millman & Rogers 1997) Hence, direct connections between various positions, roles or professionals may be neglected. This in turn may lead to the situation in which issues, challenges or ideas for improvement are unlikely brought into the attention of the management responsible for the service development.

Literature (Frow and Payne, 2011; Han, 2010; Payne et al., 2008; Sanders and Stappers, 2008; Segelström, 2013; Vargo, 2008) suggests that if a service is considered as a **joint value creation** with wide array of stakeholding partners

such as employees, customers, users, fans, intermediaries, hobbyists, artists, designers, service design professionals, suppliers, authorities, and researchers, it also adds the network perspective into the discussion (Russo-Spena and Mele, 2012). Intrinsically, the terms joint value creation and co-creation emphasize this wider view of “all stakeholders” involved in the value co-creation (Prahalad and Ramaswamy 2004, Ramaswamy and Gouillart 2010). Yet, the discussion is typically limited only to customers and users, and dyadic interactions. In their recent review of co-creation, Ind and Coates (2013) found that literature seems to focus on the aspect of “creation” more than the “co”, i.e. the togetherness aspect. Ramaswamy and Gouillart (2010) found that the ideas, suggestions, or contributions thus get a “short shrift.” This paper acknowledges the importance to focus on the “co” aspect and extends the discussion on how it can be supported.

There is a wide variety of potential stakeholders for a service, i.e. **stakeholding actors**, who can bring value into the service development. In this paper, service is considered as a joint value creation process. We examine the case through the lenses of service development and service design research. We propose that it is mutually beneficiary if miscellaneous stakeholders are engaged into face-to-face, simultaneous joint activities, from various service business related organizations, in different levels of hierarchy and dissimilar positions. This in turn may increase the diversification through the broadness of the shared information and experiences, and the amount and quality of the development suggestions. Thus, this paper promotes the value of engaging all stakeholders (Prahalad and Ramaswamy, 2004b; Ramaswamy and Gouillart, 2010; Prahalad and Ramaswamy, 2004a; Gummesson 2008) in developing service. It explores and discusses how to enable multiple stakeholders into co-creation and how to use this activity to develop service. The paper results a novel model and illustrates how multiple stakeholders interact in the area of idea-generation in service development.

2.1 Understanding the development through service design model

This paper suggests that the idea-generation is an important part of the service development process and benefits the value propositions. Retrospective, structural, and sequential innovation processes are common and used in service innovation (von Koskull and Strandvik 2014). Therefore, this paper takes a look into service design methodology for a different approach. Moreover, the paper explores multi-actor participation and many-to-many engagement actions in real time.

Service development and design competences are distinctive competences. They rely on service approach knowledge and practical implementation skills. (Grönroos 2009, Ojasalo and Ojasalo 2009) From our perspective, new competences and knowledge is required to support firms to engage with service design, which is a collaborative process enhancing the value of service. Business practioners seem to need information and hands on opportunities to apply moderns methods and techniques they can use in development and deployment of service.

The service logic and service design approach emphasize customer understanding, which was critical criterion in selecting the development model. The service development processes in service design field were investigated. There are several process models with various phases and suggested activities (see for example BIS Publishers/ Stickdorn and Schneider 2010; Moritz 2005, Edvardsson et al. 2002). From those, the research team selected the Double Diamond design process model (Design Council, UK, 2005), DD –model in short. The DD-model (see the following figure) is a commonly used approach in service design. The model was developed by British Design Council in 2005. The process is divided into four phases: Discover, Define, Develop and Deliver. In the first phase, the user needs are identified in order to get an initial idea or inspiration to start the project. In the second phase, “Define”, the needs are interpreted and aligned to business objectives. Thirdly, solutions are developed. This phase has a prerequisite of iteration and testing within the company and with the stakeholders. In the final phase of the design process, the developed service is finalized and launched in the market.

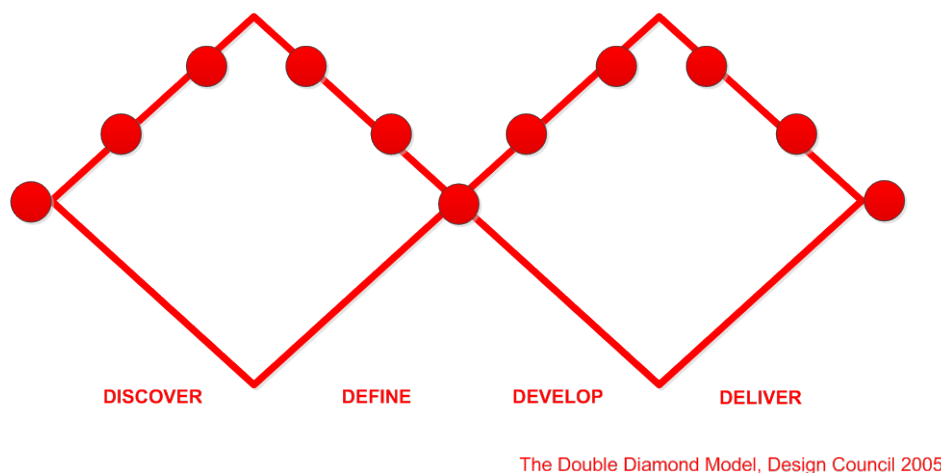


Figure 1. The Double Diamond Model (Design Council 2005).

Roughly the DD-model can be divided into two larger phases: The four phases form two separate entities for the development process (in the figure: squares) represents the designers thinking logic. Idea-generation phase and development phase. These processes can be managed differently, yet it typically is designer led and thus each phase includes typically used methods. For example the Discover and the Define phases include understanding, ideation, testing and communication activities. Previously mentioned activities in turn include various methods. The DD model is based on interaction among participants and supports continuous iteration activities. As such, it is structured and sequentially described. Yet, the iteration and dynamic properties of the model makes it usable model for real -time investigations.

The Double Diamond model provides a framework for service development. It may include various service design activities throughout the process. How participants provide their input into the process and iteration rounds is of importance. To perceive the phase dependency and iteration rounds is critical because it affects to the development process targets and outcome.

3 Stakeholder integration on idea generation phase

Research on complex socio-technical systems such as large business organizations requires novel approaches. Part of the SDL research focus on service design models, methods and tools used in order to solve the business service transformation paradigm. The service design approach is largely based on design discipline, and inherently supports the ethnographic studies. Yet, in service innovation literature, only recently, ethnographic approach is suggested as a contrast to mainstream retrospective approach (von Koskull and Strandvik 2014). Following this path, this paper explores the research project, reporting the real-time actions leading to the model. While primary method of participant observation is suggested (ibid.), this paper extends the methodological choices to cover actions during the study.

Qualitative research strategy was applied in a single case study setting in business-to-business (B2B) context in order to co-design a collaborative model. This is valid choice because researchers are unified about the central characteristics of a case study approach to be holistic and detailed in understanding (Carson, Gronhaug and Perry 2001; McKay and Marshall 2001; Gummesson, 2000, Howell 1994; Rapoport 1970). A case study may apply action research approach or vice versa (McKay and Marshall 2001). The investigated stakeholder integration project, the activities were performed and tested in real-time. As such the methodology for the study can be described as action research (AR). It is a methodological approach that embeds several streams and perspectives (Dick et al., 2009; Gustavsen, 2008; Reason and Bradbury, 2008; Coughlan and Coughlan, 2002) and as such can be described as an ethnographic method. The AR approach aims to take action and to create knowledge, and thus have both action and research outcome (Coughlan and Brannick 2014). Likewise, emphasized is the production of practical knowledge and the practical outcomes from working together with people and “ideally involving all stakeholders” (Reason and Bradbury 2008). Recently, Coughlan and Brannick (2014: glossary) defined action research as : “*A family of related approaches that integrate theory and action with the goal of addressing important organizational, community and social issues together with those who experience them*”. Here, the operating word is “together”. Thus it is a valid academic research method approach for this study.

This paper includes a case study which explores how to integrate miscellaneous stakeholders into a service development process. The context is an **industrial waste management service**. The co-designing activity was embedded in an externally funded research project, which aimed to improve strategic stakeholder integration within the case company. The authors of this paper participated to this research project (see Tossavainen 2013) and gained access on the case company, the service value proposition, processes, and stakeholders.

In the spirit of action research, the host organization and its stakeholders were involved with the study. The case company was **Lassila & Tikanoja Oyj (L&T)**. The internal stakeholder team includes the actors of the study: The members represented various units of L&T and were environmental specialists, information technology (IT) development specialists, project managers, and customer service professionals, including resources outsourced to **Elisa Ltd** and the **waste truck drivers**. The externally composed stakeholder team was formed, engaged and empowered to participate. The stakeholding organizations were **Parma Oy, Keslog Oy, Valio Oy, Puukeskus Oy, Scania Suomi Oy, Ovenia Oy, Stockmann Oyj, Caternet Finland Oy, and KONE Hissit Oy**. The individual stakeholding actors represented various functions such as environmental management, quality control, logistics, sales, key account management, development, safety, and sustainability. **Furthermore, the regulatory body responsible for the national sorting instructions, the Centre for Economic Development, Transport and the Environment (ELY)** participated the study.

The investigated activities were performed and analyzed by a research team consisting of the 3 authors of this paper. An extended research team included the case company project manager.

3.1 Many data collection methods applied

Multiple data sources including informal discussions, expert interviews, participant observation, and documents were applied. Service design methods were use in order to collect multifaceted data especially in face-to-face events.

During the period of 2012-2013, the research team of authors 1, 2, and 3 participated the study by collecting data through interviews, discussions, participant observation and participating action research activities. The research project

was executed through series of face-to-face events, which provided good opportunities to collect data, observe, and investigate activities as stakeholder integration and service development evolved and unfolded.

The service under study was firstly elaborated by informal discussions and visits to the locations. The case company was visited, observed, and series of meetings were established in order to understand the value chain, service offering, and the challenges the case company is facing. Several key stakeholders within L&T were also interviewed in order to get an extensive in-house perspective. Informal discussions and thematic interviews in the stakeholder companies with the stakeholding actors were carried out.

Documentation was produced based on the data collection and the analysis, and it included produced stakeholder maps and service blueprints. The process descriptions were investigated along with other internal documentation of L&T. Waste management reports of the stakeholder organizations were evaluated. This empirical evidence which included interview protocols, recorded interviews, and company specific documents alongside with the analysis data was stored in a separate database.

Altogether, 13 organizations and over 35 people participated to the study. Engaging stakeholding actors into simultaneous joint activities, from various organizations, different levels of hierarchy, and dissimilar positions brought broad information and experience examples during the events. The stakeholding individuals were engaged in co-creation to design and build the collaborative platform and to develop the service for the benefit of all participants. The multiple data collection resulted in rich primary data. The extended research team was able to understand the different perspectives and challenges in the current service.

3.2 Rich data analysis

Service design approach was applied to design the model through the events of participation. Through series of meetings, preparation meetings, workshops, analysis events, and seminars, the researchers gathered a wide arrange of data from recorded and transcribed interviews, to field notes, discussion notes, photos, observations, and participant observations. Relevant documentation included process and service descriptions, reports and presentation materials. The analysis of the collected data was executed by research team and at times by the research team together with the internal stakeholder team. Discussions were held on need basis to capture and clarify relevant information. Each event was planned beforehand and documented afterwards. This resulted a vast amount of plans, timetables, drafts, sketches, memorandums, reports, list of actions, and photos of the activities.

The case study focused on developing current waste management service. The design process began with the Discover phase (see Figure 1) in which the business-to-business stakeholders of the case company were interviewed. The findings from this phase were used as triggers to inspire the participants to later generate ideas for solutions. The ideas were categorized and prioritized later on with the case company. This step of the process deepened the understanding of the customer needs and their importance. In the Define phase, the design brief was modified based on the user needs identified in the interviews and the business objectives stated by the case company's contact person. A face-to-face event was organized in order to engage and motivate the stakeholders and in order to conduct multi-stakeholder activities. Several methods of service development, service design and innovation were applied in order to discover and define the service development needs. Many methods were modified and applied to fit better with simultaneous multiple stakeholder use. In this the joint development session, new methods and tools were applied to get better understanding of the chosen development target and to generate ideas to solve the identified problems or needs. Again the ideas were filtered, validated, and prioritized first with the stakeholders. This was a novel method and contradicts Ayuso et al (2011), who suggest that knowledge source from internal and external stakeholders has to be managed by the focal firm internally.

Following this activity, another event was planned, facilitated and executed. Based on the findings and analysis of the first engagement event and strong strategic guidance, the work continued. Now, the focus was shifted on another closely related service offering in order to fully use the integration of the ideas put forward by the stakeholders. There were also new stakeholding actors both external and internal brought into the event and engagement activities. The second event resulted, yet again, a good amount of validated ideas. Furthermore, the discussion among stakeholders brought new insights, suggestions, and concerns on the table. As an end result, the case company got the list of development proposals, which they can introduce to the management with the knowledge of their importance to the customers (not only one customer but several of them), the evaluation of their ability to implement the development ideas and how they were aligned to their company strategy.

The original plan to develop waste management service was not prioritized by the stakeholding actors. Methods used revealed a vast amount of issues and themes that require further attention first in order to make service more customer-centric. It turned out, that ICT service around the waste management and waste sorting were more important for the participating stakeholders. The discussion on further activities continued separately in stakeholder organizations, case company and research team.

Based on the experiences, analysis, and results of the integration workshops, the research team continued further analysis with the case company team. In order to process the data collected into design drivers and further development initiatives required integrated efforts. Figure 2 depicts the essence of the collaborative idea-generation model. The stakeholders were involved in all the steps and various methods and tools were tested.

3.3 Co-designing the idea generation model

Service development is a long process and therefore this research focused on the idea generation phase. This was due to several reasons: In discussions with the case company L&T, it was important to start from the beginning of the process and to involve numerous stakeholders to broaden the needs and demands to improve the service. The strategic choice of the case company is to place the customer into the center of the development. As such, it is according to the service research fundamentals. Secondly, by starting with idea generation, the ideas and needs for change come from the customers, users and other service involved actors and not only from the internal development team. Furthermore, it allows to focus on more concrete actions and in-depth analysis on chosen ideas. This in turn may improve the outcome of the development process. The case company can then move forward with the service development process. In short, the idea generation phase sets the development phase in its validated course.

As the DD -model is very generic model for the whole service development process, the research team decided to apply it in a new way as described in the previous section. The extensive activities in format of meetings, events, and analysis sessions provided a platform to discuss, suggest, test, validate and execute developed ideas for the way of working. Co-designing collaborative idea-generation model with stakeholders was a result of all these collaborative activities, and individual efforts of each participating person. The stakeholders were invited to workshops in which several tools were used to integrate stakeholders into service development. The research team suggested the workshop idea, methods and activities to case company team. The research team was also responsible in facilitating the workshops in order to save time and efforts. Each workshop comprised sub sections with varying objectives, tasks, and tools. The storyline for the workshop was developed and operationalization of the workshop was carried out. After the workshop, memos were created and analysis was carried out.

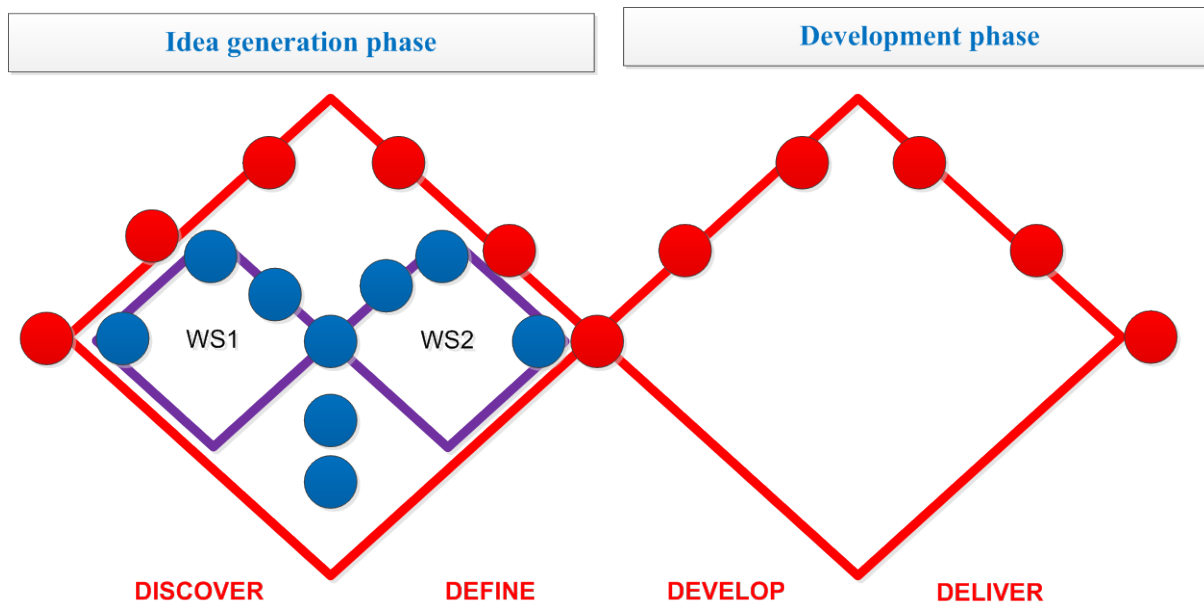


Figure 2. Modified Double Diamond model.

The figures 2 and 3 illustrate how the stakeholders were involved in each different step of the design process. The stakeholders may vary in different workshops but in every occasion they represented several organizations and functions of the stakeholder organizations. Their simultaneous participation was at most important to identify the most essential design drivers to guide the ideation phase and the design process further on. Through participating to the research project, the stakeholders learned to co-create. The stakeholders also learned service design and development process approaches, recent theoretical findings, and application of models and tools into practice.



Figure 3. Photos of the analysis session with the internal stakeholder representatives and the extended research team.

Categorization and analysis of the collected data tighter with the research team and internal stakeholder team provided another set of new knowledge and skills. In collaboration with all participants, i.e. the external business partners, case company representatives and the research team, the development activities were tested, redefined, executed and discussed. For all business practioners, the discussions and feedback sessions provided opportunities to elaborate the learnings, findings, and share knowledge. The practioners both internal and external stakeholders benefit from the research team which supported and facilitated studies, activities, and analysis processes. Yet, it provided enough examples to carry out similar tasks themselves in the future.

In the spirit of the action research the participants were actively involved in the testing and filtering of the ideas during the model development. Especially in the final definition phase the common understanding and view of the critical design drivers was collaboratively defined (see the figure 3). Separate analysis groups (working with the same data) found and categorized development initiatives first, which was then elaborated together before moving into integrating the results. Interestingly enough, the original waste management service initiative was not totally neglected, but modified with new development ideas to improve the digitalization aspect of the service.

4 Findings and expected implications

While the service business and developed service are becoming more and more complex, and may form systems of service, a more holistic view of the service is needed. Gummesson (2008) challenges the fragmentation of marketing and business functions and calls for more pragmatic and holistic approaches. Our investigation and experiences from this case study agrees with this notion. A wide array of professionals involved with the service development, their knowledge, experience, and professional skills can be harnessed into the service development and innovation.

Empirical evidence and insights from the case study suggest that a service provider (the case company) can strategically leverage simultaneously various stakeholders in service development process. This can also be an effective way to get insights not only from user or customer but a larger group of stakeholding actors both internally and externally to capture and prioritize ideas. Further, stakeholder understanding is pivotal for identifying design drivers that are used first in idea-generation phase and later applied in development activities. This paper also reveals that double-loop in idea-generation is valid due to continuation of deeper examination of the development ideas. The study suggests co-designed collaborative innovation model as a useful approach(see figure 4) to take into account service development opportunities and exploit the stakeholders' knowledge.

This novel model engages both the internal and the external stakeholders into action i.e. service development. It changes the role of a stakeholder from a passive information provider and co-producer to a truly collaborative partner. Collaborating actors from diversified fields of industry, different levels of hierarchical roles, and specialized positions, may also learn from each other. Co-designing collaborative idea-generation model with stakeholders resulted in two-way; first, the learning of joint activities, i.e. the collaboration part of the development. Second, the generated ideas are rigorously validated and prioritized for further actions.

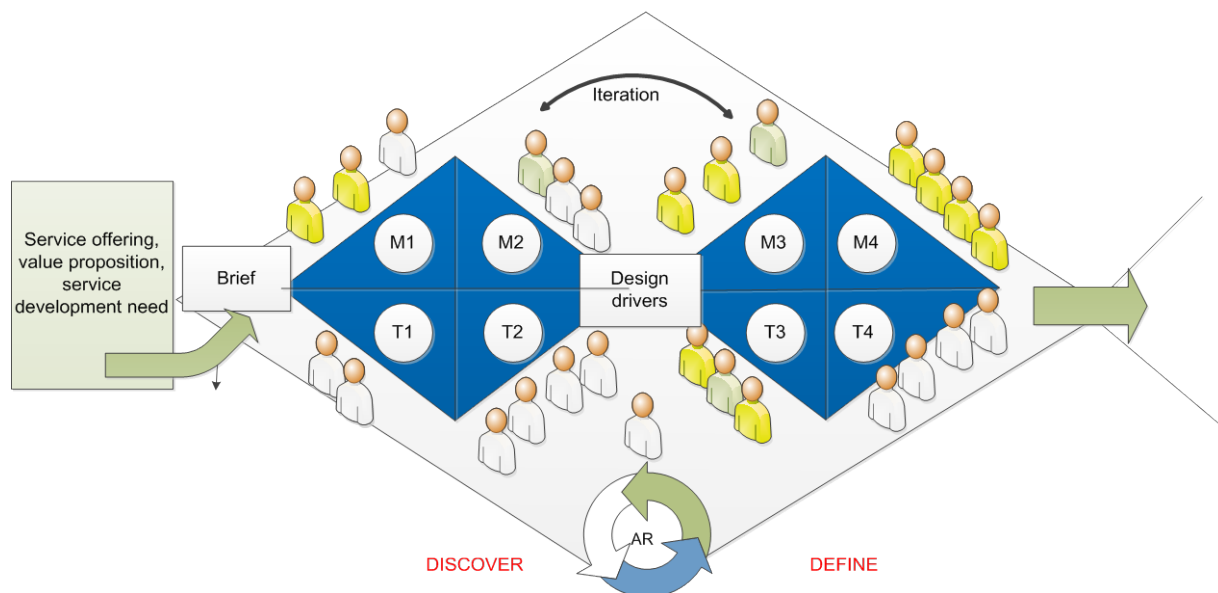


Figure 4. Collaborative idea-generation model.

As this paper focused on the process of revealing how the co-designing of the collaborative idea-generation model was created, the model is not further elaborated. Figure 4 depicts the iteration rounds and action research approach with sets of methods and tools that can be used in various phases.

The concept of balanced centricity states that all stakeholders have the right to satisfaction of needs and wants (Gummesson 2008). This research however suggests that there needs to be a place for negotiation of ideas and development initiatives beyond the individual needs and wants. This requires a platform and a model to conduct the needed activities. Facilitation is crucial for the success of the activities.

In simultaneous collaboration the stakeholders identify the biggest service development potential as suggested in the co-development model. This results in collaborative prioritization of following development activities beneficial to all parties. The empirical data discussed and the key performance indicators (see the following table) show that the model is a valid model to be conducted in service development.

The following table summarizes the main KPIs of the research project.

Table 1. Key performance indicators of the research project

145+	Ideas were generated	workshops
35+	persons involved and participated the study ranging from truck drivers to authorities	Workshops, seminars for the external stakeholders, All events and sessions with the internal stakeholders
13	Organizations participated with the partner firm; customers and authorities, outsourced, internal	Workshops and seminars
1 + 6	Partner firm participants	Continuous participation of the study; meetings, workshops, seminars; planning, analyzing, carrying out, exploring, monitoring, validating, and evaluation.
35+	Co-creation events held to design and develop the project and service	Informal discussions, interviews, in-depth analysis of the documents, meetings, workshops, seminars, actions, participant observations

4.1 Theoretical implications

This paper contributes the academic discussion in various ways. The theoretical implications of this paper validates the theoretical frameworks of balanced centricity and stakeholder-centric approach. Further, these theoretical frameworks are applied uniquely in service development context. Integration of wider variety of stakeholders into service development contributes current discussion and extends the resource integration concept towards deeper collaboration by providing a theoretically based new collaborative idea-generation model.

The empirical results contribute to resource integration discourse and stakeholder engagement. Multi-simultaneous face-to-face approach was unique because typically dyadic relations prevail. The study contributes to service research in providing the empirical evidence and strengthens the theoretical framework.

Moreover, the paper contributes the service development process discussion. In collaboration with variety of stakeholders, the DD-model was modified in several ways: The idea generation requires more time, and many methods and tools to be applied in order to capture the experiences and knowledge of the stakeholders. Iteration rounds are significant and increase the understanding of the service value-in-use.

In order to capture the essence of the balance centricity, true stakeholder integration with extended amount of resources to develop the service, more methods could be used. This would inherently also mean that those methods need to be modified for the simultaneous use of larger amount of people.

4.2 Managerial implications

The paper shows that the stakeholders are motivated and committed to the joint development and capable of working collaboratively when the face-to-face meeting is facilitated.

The stakeholders (individuals) did not know each other. All previous activities between the case company and the stakeholder company was bilateral. Thus, the understanding of the complex service system, the needs, and the requirements for it, were only partial. To build development initiative based on each bilateral interaction may be time and resource consuming. Further, it requires extensive skills in capturing the essence and convergence various issues into holistic view. By inviting, facilitating and integrating multiple stakeholding actors at the same time, in face-to-face event, into specific activities means that there is a lot more issues discussed, shared and negotiated from various perspectives at once. It brings the essence of customer understanding and reduces the time needed for converging the ideas. The converging takes place simultaneously while the stakeholders are provided means to discuss and deliberate ideas found. Through this integration of stakeholding individuals in various firms and expertise areas, and through live collaboration, the service was not only understood more extensively but also further developed.

The managerial implications of this paper suggest that facilitation is a key competence in service development. Capability to understand the context holistically and apply existing methods, techniques and tools in novel ways with stakeholders is pivotal.

5 Discussion

A generic service development model such as the Double Diamond model (Design Council 2005) fits well with B2B context and also with larger organizations. However, the study shows and results suggests that those generic models can be further developed and modified. The model developed during in an externally funded research project in collaboration with the participating stakeholders is a good example of the co-designing activities and application of the customer-centric approach and moving towards stakeholder centricity. Furthermore, the results indicate that integrating resources not only for the sake of the research project but also for the sake of business benefits is pivotal. There is no room for short cuts in getting customer understanding. Moreover, in larger organizations, it is crucial to get customer information, experiences, and professional expertise in full use by integrating those stakeholding resources available simultaneously in collaborative activities.

5.1 Conclusions

Getting the B2B customer understanding is the first priority for L&T. Leveraging knowledge from the stakeholder companies was a strategic choice. It is according to the company level strategy and according to the recent developments in service thinking. As such it was a good fit the research project objectives. Although the service paradigm was already introduced in the partner firm, service development and service design methods and tools were new to the firm. And the role of the research team was to introduce them and innovation methods to the partner firm and their customers.

As a result of the research project, the partner firm had an opportunity to try out various new methods and tools, and thus learned to use them in real-life situation. This allows those methods and tools to remain in the toolbox of the partner firm for later use. For academics, the co-designing of the project itself and also the collaborative idea-generation model with various stakeholders was a positive outcome of the project. The partner firm professionals who participated to the project got direct input and understanding from the participating stakeholders. This information created together and shared among the project participants lead to learning among the participants. New knowledge was co-created, which was a basis for new argumentation that allowed the experts of the partner firm to justify development ideas and the use of the customer-centric strategy.

5.2 Future research suggestions

This paper illustrated a study that resulted with a new collaborative idea-generation model. The proposed model warrants limitations while it was co-designed in one business-to-business setting and context. As this study focused on the idea generation phase of the DD model, it would be beneficiary to extend this approach and test this model to the latter part of the model. Furthermore, the move from customer-centricity to balanced centricity (Gummesson 2008) or stakeholder centricity requires further studies on both theoretical construct creation level as well as in practical empirical level.

As this was a single case study, the research project did not test the model in other contexts. It would be beneficiary to test the model again either in the same context or in other B2B context to validate the preliminary findings of the research. Furthermore, it would be beneficiary to study where the origin of the enthusiasm for development and for the trust for many-to-many stakeholder engagement comes from. This would be a new phase in the beginning of the model created.

Another research opportunity would be simplifying and unifying the terms in different fields and sectors of studies. The co-design seems to be a worthy theme to carry out more research, and maybe further develop the terminology and meaning of the constructs.

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Ecopreneurs in Norway: A Statistical Analysis

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This paper explores the volume of ecopreneurship in Norway. Hitherto, a few attempts to measure the “green sector” are found in Norwegian studies. These studies are often based on turnover statistics and standardized industrial classifications, and fail to incorporate the broader conceptual discussion highlighted in the research literature. The lack of conceptual awareness in the Norwegian studies creates a crude mapping of green enterprises, without going into detail on core business activities, initial business plans, objectives in product and service development and the start-up process. In terms of measuring ecopreneurship and creating a more balanced picture of green business activities in Norway, these considerations should be included. To address this issue, I use firm-level data from 437 companies to illustrate the challenges that arise in the process of operationalizing green business activities and the possibilities and limitations related to different approaches.

1 Introduction

“I believe very strongly that corporations could and should be a major force for resolving social and environmental concerns in the twenty-first century”

William Clay Ford, Jr (Executive Chairman, Ford Motor Company, 1998).

In recent years the discussions about corporate greening and environmentally sound business practices have influenced the research agenda. In relation to this debate, the *ecopreneur* has occasionally been portrayed in the academic literature (Anderson, 1998: Pastakia, 1998: Keogh & Polonsky, 1998: Isaak, 2002: Schaper, 2002: Schaltegger & Wagner, 2011). Similarly to entrepreneurs, ecopreneurs is considered agents of change (Anderson, 1998). In contrast to entrepreneurs, ecopreneurs have the ability to drive the economy towards sustainability by transcending the usual tension between business and the environment (Beveridge & Guy, 2005). However, the conception of the ecopreneur is ambiguous, leading to a multitude of definitions and understandings as well as difficulties in terms of operationalization. Sometimes, ecopreneurship is used interchangeable with green enterprises and environmental management (Schaltegger & Wagner, 2011). In other cases, ecopreneurship is simply understood as start-ups in business sectors that are entirely environmental-relevant, such as sewage and refuse disposal (OECD, 2011). Due to this ambiguity, it is difficult to establish ecopreneurship as an independent and feasible research field that can contribute with new knowledge in policy-making processes and regional development.

Based on firm-level data of 437 enterprises, this paper offers a critical discussion of the possibilities, limitations and challenges related to the different theoretical and methodological approaches involved in measuring green business activities, in particular ecopreneurship. First, the paper aims at increasing the awareness in relation to the system of concepts, as well as the approaches used to measure green business activities. Secondly, the paper calls for a more comprehensive framework that makes it possible to discriminate between ecopreneurship and other green business activities. In this relation it's important to emphasize the idiosyncrasy of ecopreneurship in order to guide researchers to conduct informative studies that can contribute in policy-making processes. Finally, theoretical and methodological discussions are combined with firm-level data from 437 enterprises in an attempt to measure the volume of ecopreneurship in the Norwegian economy.

The paper is structured as follows: Section 2 presents understandings and conceptual discussion found in the literature. In section 3, the research design and methodology is explained, before the data is presented and discussed in section 4. Section 5 focuses on the idiosyncrasy of ecopreneurship in relation to the theoretical and empirical discussions from section 2 and 4. In the final section, some concluding remarks are drawn.

2 Ecopreneurship – Sector, Firm or Technology Dependent?

Hitherto, the research on ecopreneurship has primarily focused on explaining the phenomena and creating typologies for defining ecopreneurs (Anderson, 1998: Schaper, 2002: Cohen & Winn, 2007: Schaltegger & Wagner, 2011). A literature review reveals a number of understandings and different ways to conceptualize the phenomena. Sometimes the term is used to describe the person or team who launch a green business (Cohen & Winn, 2007). In other cases ecopreneurs are used on innovative business leaders who are striving to implement technological and non-technological innovations as a strategy to become greener (Schaltegger & Wagner, 2011). Despite the conceptual ambiguities, most understandings share a common feature; *ecopreneurs are actors whom somehow combine economic and environmental performance*. However, the determinants of being an ecopreneur are not clear. Some authors focus on the environmental orientation of firms, other emphasizes the internal motivation of individuals, and yet others highlight the business sectors and technologies involved (Cohen & Winn, 2007: Schaltegger & Wagner, 2011: OECD, 2011). The remainder

of this chapter aims to clarify the concept of ecopreneurship and the different approaches used to identify and measure ecopreneurship and related concepts.

2.1 The cross-sectorial nature of green businesses

Initially, a brief discussion about business sector is necessary in order to give an account of the current academic debate. Green businesses can be found in all industries and for that reason commonly referred to as cross-sectorial (OECD, 2011). Accordingly, it is hard to identify green businesses using standardized classification systems such as NACE and ISIC, since these systems are based on value-chain logics (Menon Business Economics, 2010). The exception is business sectors that directly profit on producing goods and services that are grounded on environmental outcomes, for instance NACE (E38) *Waste collection, treatment and disposal activities* and NACE (G47.7.9) *Retail sale of second-hand goods in stores*. These sectors are usually considered environmental “core sectors” (Rogalandsforskning, 1997: OECD, 2011). To elucidate the difference between “core sectors” and “non-core sectors”, OECD (2011) distinguishes between *output* and *process* approach. According to OECD (2011) ecopreneurship can be defined in terms of the sectors firms are active in. This is called the *output approach* and corresponds with the “core sectors” in that they are restricted to parts of the economy producing specific types of output. On the other hand, the *process approach* is defined in terms of the technology used for production in any sector of the economy, referring to the act of making a business “greener” as opposed to entering the “green sector”. OECD (2011:25) interprets ecopreneurship as “entrepreneurship” in “green” sectors, exclusively focusing on the *output approach*. It is however problematic to include the *output approach* in surveys on ecopreneurship since the environmental benefits are intrinsic to the business. Put simply, the term ecopreneurship lose its significance if every business operating in environmental core sectors gain status as ecopreneurial. Ecopreneurship should include a particularity that makes it possible to distinguish it from other types of green business activities. Accordingly, focusing on the *process approach* are more suitable since the environmental benefits are extrinsic to the business and likely to differ from conventional start-ups in terms of the strategies, barriers and challenges involved. This is emphasized by Yang et al. (2012) who note that eco-innovation dynamics are different from conventional innovation processes, particularly in terms of how stakeholder groups are interacting and how environmental concerns are integrated in the process.

2.2 Environmental Technology and Turnover

Focusing on environmental goods and services and the subsequent turnover is also a common strategy used to identify green business activities. Green businesses and ecopreneurs are generally connected to environmental goods and services²⁵⁴ in one way or another, either through development or implementation. Most of the definitions referring to environmental technologies emphasize that it includes products and services that *reduce* the environmental load, i.e. is *less harmful* than current technologies (Eurostat, 2009: OECD, 2011). These definitions do however have its flaws once the temporal and geographical dimension is included. Products and services are continuously undergoing incremental and occasionally radical improvements as time goes by. Some environmental goods and services will eventually become conventional technologies, other will hardly reach the market, whereas others will sooner or later be outdated. Consequently, in terms of statistics, a technology, or a green enterprise determined on the basis of a technology can only maintain their status for a short period of time unless the data are frequently updated. In relation to this discussion, Menon Business Economics²⁵⁵ (2010) argue in their report that it's possible to claim that virtually every company is “green” due to incremental improvements that gradually transforms the business community towards a more sustainable path.

The geographical context is also necessary to consider in this connection, as enterprises in industrialized countries are likely to have a different frame of reference than their counterparts in developing countries. Due to the relative nature of environmental technologies, it is possible that manufactures in South American countries use environmental technologies in production, while the same technology is conventional or even obsolete in the Nordic countries.

Turnover figures are often used as a quantifiable measure that makes it possible to identify enterprises based on environmental goods and services (Eurostat, 2009). Enterprises that report turnover from environmental goods and services are considered green businesses. In a report by Menon Business Economics turnover statistics is used in more satisfactory way by giving companies an “environmental weight” based on the share of turnover that is related to environmental technologies (Menon Business Economics, 2010). As a result, they are able to distinguish between enterprises with 20 per cent turnover from environmental goods and services and those whose total turnover come from environmental goods and services. A weakness by using this parameter to determine green businesses, is that turnover figures fail to include organizational changes and process innovations. Neither do the figures contain information about the content, qualities and impact of the environmental goods and services. Consequently, turnover figures per se are probably more suitable in terms of measuring fluctuations in the level of green activities in the economy, rather than as a determinant for identifying ecopreneurs or green enterprises.

²⁵⁴ Similar terms found in the literature are 1) cleantech, 2) environmental technology, 3) eco-innovations, and 4) green technologies and services.

²⁵⁵ Menon Business Economics is a consultancy firm that provides businesses, organizations, and government with industry analysis.

2.3 Environmental Performance – Trustee Duty or Core to the Business?

In the ecopreneurship literature, the environmental orientation of firms is given considerable attention. One of the most important contributions in this connection is the positioning matrix developed by Schaltegger (2002) and later extended by Schaltegger & Wagner (2011). This framework considers environmental orientation to be the main determinant for ecopreneurship. According to the positioning matrix, a company's environmental orientation is divided into low, medium and high priority. Companies who regards environmental protection as a *trustee duty* falls into a low priority category, while medium priority is given to companies who sees environmental goals as *supplementary to conventional business*. A high priority category is applied if companies integrate environmental issues in their *core business activities* (Schaltegger & Wagner, 2011). High priority is a prerequisite for ecopreneurship, and accordingly useful to distinguish ecopreneurship from other types of green business activities such as environmental management. However, as Nawrocka et al. (2009) emphasizes, having some kind of environmental strategy or eco-friendly actions is the rule rather than the exception in the prevailing business community. Accordingly, environmental orientation may be difficult to operationalize since it can materialize in many ways, including application of environmental goods and services, adoption of eco-certifications and other corporate environmental activities. The fact that environmental orientation includes a broad range of environmental activities is however advantageous in terms of measuring companies that depends their environmental performance on organizational changes, in contrast to turnover figures which only include environmental performance based on sales (section 0 & 0). The possibilities and limitations of the different measures are further discussed in the empirical section.

2.4 Business Plan and Intentions

Several authors emphasize the initial business plan and incorporate individual's ethical, social and environmental motivations in their definitions of ecopreneurs (Anderson, 1998; Isaak, 2002; Dean & McMullen, 2007). Focusing on the initial business plan is considered to capture the entrepreneurial dimension of green enterprises, and is reflected in the distinction between "*green business*" and "*green-green business*" (Isaak, 2002). According to Isaak (2002) a "*green business*" refers to companies moving towards environmental responsibility, in contrast to "*green-green businesses*" that are companies whose products and processes are designed to be green from the start. A number of researchers argue that the ideal ecopreneur launches a "*green-green business*", and are more likely to be driven by environmental and social concerns than "*green businesses*" that primarily are driven by profit (Pastakia, 1998; Isaak, 2002; Cohen et al., 2008). Similar considerations is found in Taylor & Walleys typology (2004), as the authors base the framework on internal motivations ranging from pure economic orientation in on end to sustainability orientation in the other. The focus on intentions is however criticised because the intentions of the producers is not relevant if the technical nature of their activities are inconclusive (OECD, 2011). Consequently, combining parameters may result in more accurate data in surveys on ecopreneurship and green business activities.

3 Research Methodology

The data presented in this paper were obtained during May 2014 by means of an online survey distributed to a wide range of companies located in Norway. The overall objective of the survey is to measure the volume of ecopreneurial activities in Norway using a variety measures found in the literature.

3.1 Survey design and distribution

The survey was designed to incorporate the conceptual discussion found in the research literature (section 0). Consequently, the survey takes account of several criteria that can be used to identify green businesses. This includes among other things questions concerning turnover, business plan, company profile and intentions (see Appendix 1, forthcoming). Using multiple questions to measure the same concept was a preferable strategy for two reasons. Firstly, (1) to illustrate the complexity involved in measuring ecopreneurship and green business activities, and more importantly (2) to check the consistency in the responses by comparing answers intended to measure the same concept. The latter cause is particularly useful in terms of identify and distinguish ecopreneurship from other green business activities (section 0).

The survey combines *open-ended* questions and *fixed-response* questions. The *open-ended* questions were used to obtain general information about the company, whereas the *fixed-response* questions form the basis of the analysis. The *fixed-response* questions were easy to analyse and interpret due to extensive use of Likert scales presenting a range of possible responses anchored by two opposing positions. The *fixed-response* questions were also complemented by a comment field which allowed the respondents to go into details if necessary. The survey was electronically administered through the program *SurveyXact*. Before the survey was distributed, the questionnaire was pretested on four CEOs representing companies within different business sectors. A few adjustments were made based on the pilot studies before the survey were distributed to a sample of 1154 companies representing 62% of the total population of 1860 companies. More details regarding population and sampling are given in the next section.

3.2 Population and Sampling

The total population include 1860 companies selected on the basis of business sector, start-up year, organisational form and size (Table 1). The selection process was administered through *Proff Forvalt*, a service that gives access to *Brønnøysund Register Centre*, the national register of business enterprises.

Table 1. Enterprises in the survey are based on the following criteria: business sector, start-up year, organizational form and size.

Selection criteria	1	2	3	4
Criterion	Industries according to NACE Codes (table 2)	Start-up year after 1.1.2004	Organisational form as private limited company	Number of employees between 5-99
Population	84232	13866	12415	1860

First, the companies were selected according to business sector. Enterprises that are registered in Norway will automatically be given a NACE-code when they report and register the business in the national Register of Business Enterprises. In this study, enterprises that are registered according to the NACE-codes in Table 2 are included in the population, resulting in a preliminary population of 84232 enterprises (Table 1).

Table 2. NACE-Codes that are included in the population.

Section	Subdivision	Description
B – Mining and Quarrying	6	Extraction of crude petroleum (6.1) and natural gas (6.2).
C – Manufacturing	10–11, 13–17, and 19–32.	All manufacture production and processing activities in section C, except manufacture of tobacco products (12), printing and reproduction of recorded media (18), and repair and installation of machinery and equipment (33).
M – Professional, scientific and technical activities	71, 72 and 74	Architectural and engineering activities; technical testing and analysis (71), scientific research and development (72) and other professional, scientific and technical activities (74).

The sectors included in the population represent a variety of manufacture and processing activities, professional services, engineering activities and research and development (R&D). Enterprises that are registered in “green sectors” such as *Waste collection, treatment and disposal activities* (38) and *Remediation activities and other waste management services* (39) are not included in the population. This is due to the challenges that arise if one includes the *output approach* in the mappings, instead of focusing on the *process approach* of transforming business sectors towards sustainability (section 0 & 0).

The second selection criterion is related to the start-up year. Enterprises established later than 1th of January 2004 were included in the population. Since some of the questions focus on the initial stages, a ten-year perspective was chosen to increase the validity and reliability. A longer temporal dimension will increase the probability of getting erroneous data due to changing ownership structures, unreliable sources, and difficulties in recollecting the past. Although this criterion was included in the selection process, nearly a fourth of the responding companies were originally established before the set date, but had for various reasons been assigned with a new business registration number after the set date. Accordingly, the original start-up date of these enterprises is not taken into consideration in the national register of business enterprises. Nevertheless, including this criterion in the selection process reduced the population to 13866 companies (see Table 1).

In the third case, a delimitation regarding organisational form was included in the selection process. Only private limited companies are included in the survey. Organisational forms such as one-person businesses, public corporations and limited partnerships were excluded from the population. These organisational forms were excluded for various reasons related to stock exchange listing, credibility and recognition in the market. However, the majority of the enterprises in the selected business sectors (Table 2) were private limited companies, resulting in a small reduction from 13866 to 12415 enterprises (Table 1).

Finally, number of employees was used as a selection criterion to limit the size of the enterprises. Enterprises that employ 5–99 people were included, corresponding to classifications in national statistics. Avoiding self-employed and microbusinesses at one end of the scale, and large enterprises at the other is necessary as the enterprises identified through the survey will be used in prospective qualitative case-studies. A large share of the private limited companies has less than 5 employees, reducing the preliminary population of 12415 enterprises to a final population of 1860 enterprises (Table 1).

The following stage was to obtain contact information to all the companies in the population. Contact information was obtained manually using the enterprises web pages. Of the total population of 1860 companies (N population =

1860), it was possible to obtain adequate contact information to 1154 companies (n sample = 1154), representing 62% of the total population. Due to lack or maintenance of web pages and terminations, it was not possible to obtain contact information to the remaining 38 per cent of the population. However, a subset representing 62 per cent of the population is a solid foundation and should provide a good coverage of the population. In addition, the process of manually obtaining contact information gave valuable knowledge and information about the population and the business activities involved.

The survey was distributed via e-mail to CEOs and General Managers. The survey was open for three weeks in the period 5th of May 2014 – 27th May. During this period, three reminder e-mails were sent to those who had not responded. The survey was distributed to a sample of 1153 companies, of whom 437 companies responded, equalling a response rate of 38%.

4 “Green Business” or “Greening” the Business?

A total of 437 questionnaires are analysed. The responding companies represent a variety of the Norwegian industry including manufacture and processing activities, professional services, engineering activities and research and development (R&D) (section 0). However, the population does not include enterprises in environmental core sectors that are restricted to certain parts of the economy (section 0). This is due to the difficulties of including enterprises and entrepreneurs who simply enter a “green business” as opposed to those who are making the business “greener”. Entrepreneurs who struggle to make a business “greener” are likely to face other challenges and barriers than entrepreneurs who enter “green” sectors. Consequently, in order to capture the distinctive qualities of ecopreneurship, excluding the *output approach* and consider the *process approach* is a reasonable point of departure. Finally, the national register of business enterprises is not flawless and accordingly there’s a possibility that some of the enterprises in the population is more related to the *output approach*. Figure 1 shows that the 437 enterprises are divided by 13 different business sectors. The figures are based on the enterprises report on principal activity in the survey, and not the NACE-codes found in the business register.

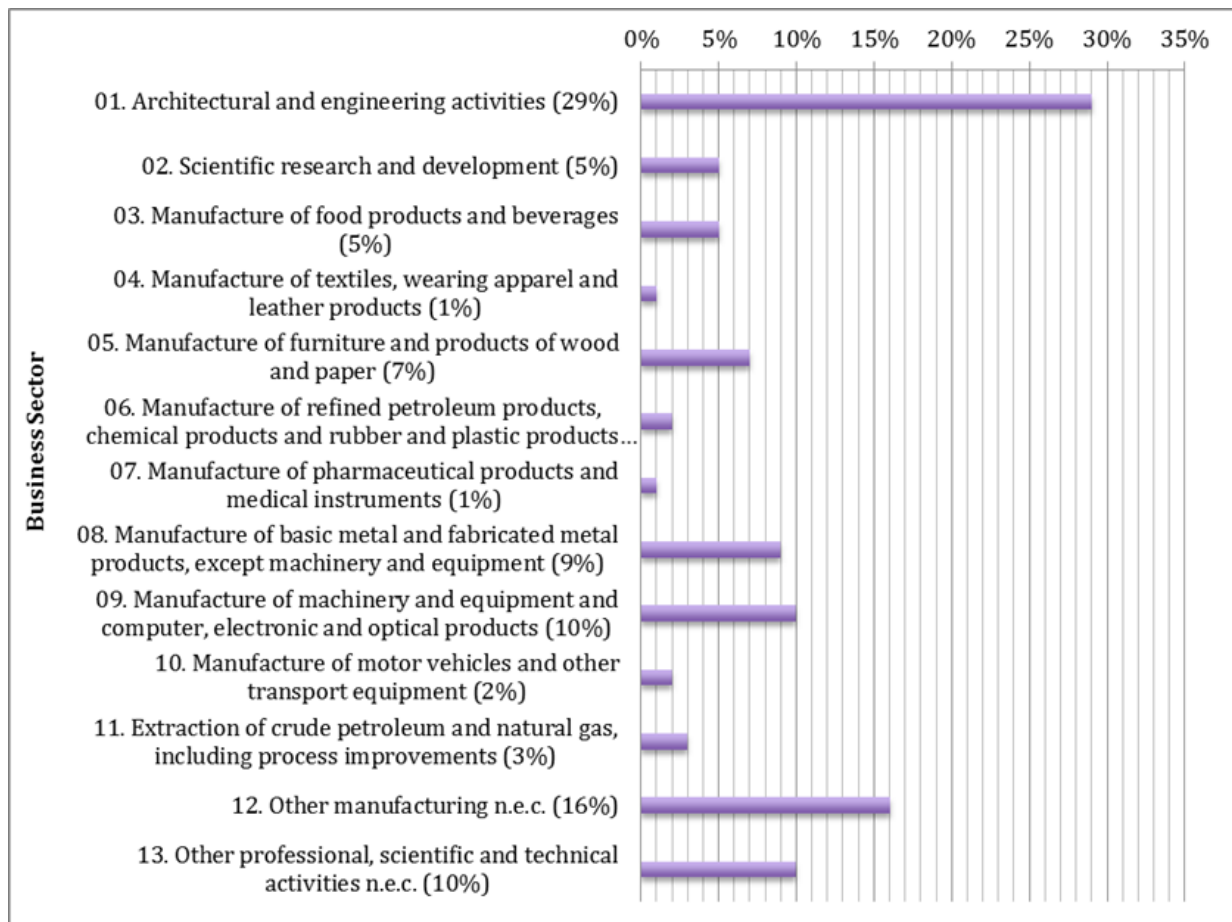


Figure 1. Responding enterprises according to business sector (N=437).

Enterprises doing various architectural and engineering activities (29%) are highly represented. In addition, manufacture of machinery and equipment (10%), and metal products (9%) are fairly common. Many enterprises also classify themselves in the following categories; other manufacturing n.e.c. (16%) and other professional, scientific and

technical activities n.e.c. (10%). The remaining 26 per cent are scattered across various categories, ranging from food production to medical equipment, indicating great variety in the population.

4.1 Green is the new mainstream

Initially, it's interesting to note that the responding companies represent a variety of environmental orientations. In some cases, enterprises have developed advanced environmental technologies with a clear purpose embedded in a green business model. In other cases, the environmental orientation is reflected in organisational changes such as energy efficiency, recycling and other environmental management actions. Consequently, it is problematic to operationalize terms like "ecopreneurship" and "green businesses" due to the complexity of environmental strategies involved. This is reflected in the data, as 58 per cent of the enterprises *agree* (32%) or *partly agree* (26%) that they make use of technologies and services that contribute to mitigate environmental problems (Table 3).

Table 3. Enterprises response on following state "The Company contribute to mitigate environmental problems by use of technologies and services that are less harmful than relevant alternatives (compared with current/competing technologies and services or absent alternatives, N=437)".

Response	Number of enterprises	Percent of enterprises
Agree	141	32%
Partly agree	114	26%
Neutral	133	30%
Partly disagree	22	5%
Disagree	37	8%

The high number of responding companies indicates that focusing on products, processes and services is a vulnerable strategy in terms of identifying ecopreneurship and green enterprises. As Nawrocka et al. (2009) noted its common among enterprises to address environmental issues to a greater or lesser degree (section 0). In this sense, the high percentage can best be interpreted as part of a broader environmental strategy reflected in application of environmentally sound goods and services. Additionally, as emphasized in Menon Business Economics report, the bulk of incremental improvements in products and services often include minor environmental benefits that gradually drive the economy towards sustainability. On this basis it is likely that enterprises are prone to include such improvements when they report use of technologies and services that contribute to mitigate environmental problems.

Consequently, defining enterprises based on means of production as well as the products and services they offer is a demanding task. In cases where life cycle assessments (LCA) and benchmarking studies are available it is more likely to identify ecopreneurs and green enterprises based on this parameter.

4.2 Is turnover statistics a viable parameter?

In terms of turnover, only 17 enterprises (4%) report that environmental goods and services accounts for 100 per cent of the turnover (Figure 2).

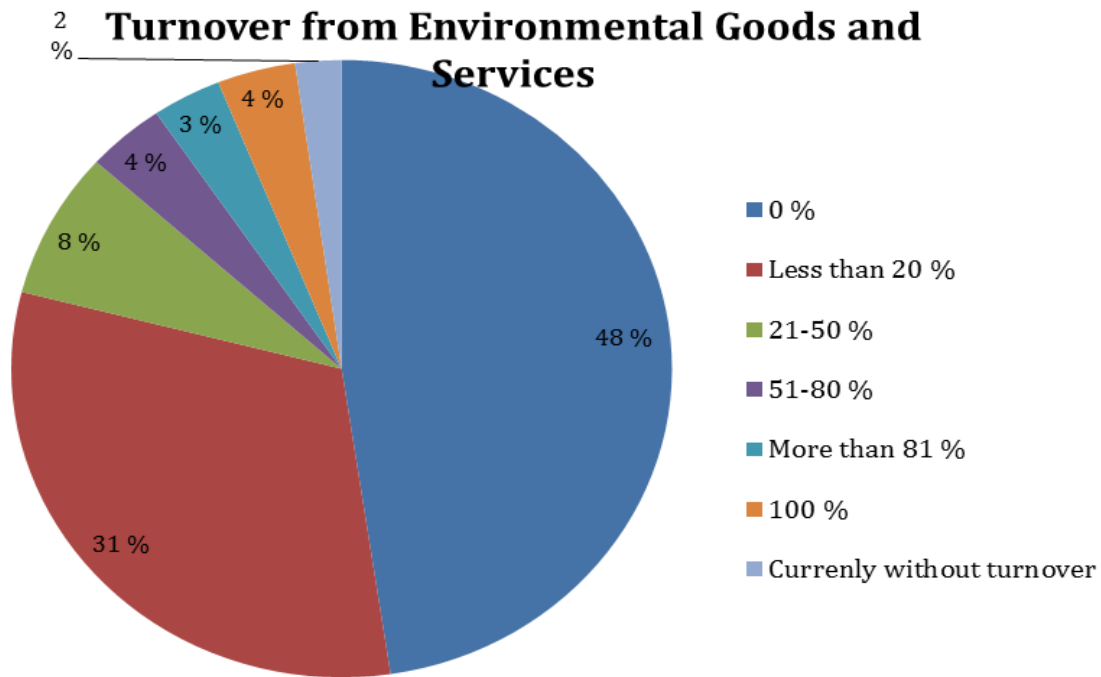


Figure 2. Turnover from environmental goods and services. The numbers in the pie chart shows the percentage of enterprises that report on turnover from environmental goods and services (N=437).

However, as Figure 2 shows, it's common that environmental goods and services accounts for a portion of the revenues, rather than the total turnover. Approximately 50 per cent of the 437 companies report turnover from environmental goods and services. This may typically be companies supplying equipment for wind farms or services related to green building projects. Many respondents emphasize that they are present in the "green economy", although it doesn't make up the principal activity of the enterprise.

"We're not a green business, but we do a lot of advisory services related to environmental planning in construction"

(Enterprise in Architectural and Engineering Activities)

"The company participate in a lot of product development, and some of the products are environmental technology"

(Enterprise in Scientific Research and Development)

Menon Business Economics include this in their mapping by giving companies an "environmental weight" based on how much of their activity that is related to environmental technology (section 0). This strategy may be useful to measure environmental activities in the economy, but it's not a suitable way to depict ecopreneurship and green enterprises, as their activities primarily are driven by clients or the project they are involved in. Put simply, the demand created by a hydro power expansion will increase the level of environmental activity in the economy, but it will not turn the contractors into "ecopreneurs" or "green enterprises". A considerable portion of the enterprises fall into this category, as 31% reports that environmental technology accounts for less than 20% of the turnover. On the other hand, enterprises with more than 50 per cent turnover from environmental goods and services indicate that the principal activity is related to environmental issues. On this basis, it is possible to argue that these enterprises can be coined "green businesses". Drawing upon this logic, figure 2 shows that 11 per cent of the enterprises report more than 51% turnover from environmental goods and services, equalling 49 of the enterprises. However, turnover statistics is a result of products and services sold to customers and do not capture internal activities such as organisational changes, process innovations and means of production. Consequently, turnover statistics are fallacious in certain cases as noted by some of the respondents.

"The company are highly focused on the environment. We exploit the whole fish, including all the by-products. In addition we have undergone several environmental measures related to energy consumption, preservation and packaging. Zero percent of the turnover comes from environmental goods and services, but the processes and organization is highly eco-friendly"

(Enterprise in Manufacture of Food Products and Beverages)

Considering this, turnover figures only include enterprises that directly profit from sales of environmental goods and services. Enterprises that increase their environmental performance by internal readjustments are likely to get ignored if turnover figures are the only parameter in the mappings.

4.3 The core of the business

In the ecopreneurship literature, environmental orientation is often given considerable attention in terms of defining enterprises as “green” or “ecopreneurial”(section 0). Enterprises that consider environmental performance as core to the business have a high environmental orientation, as opposed to low orientation in which environmental protection is regarded as a trustee duty (section 0). Table 4 shows how companies responded on environmental orientation.

Table 4. Enterprises response to following statement: “Environmental performance is core to our business”, (N=437).

Response	Number of enterprises	Percent of enterprises
Agree	40	9%
Partly agree	51	11%
Neutral	122	27%
Partly disagree	45	10%
Disagree	189	42%

The survey data shows that 9% of the enterprises *agree* and 11% *partly agree* that environmental performance is core to their business. These numbers illustrate that it’s easier for companies to identify themselves as “green” in terms of *product and service applications* and *turnover* than *environmental orientation*. In contrast to the previous parameters, environmental orientation is difficult to quantify, but still a good way to conceptualize the goals and identity of enterprises. For instance, a company supplying foundations for offshore wind parks will probably report a certain amount of turnover from environmental goods and services. However, the company are not likely to report environmental performance as core to the business, and may even regard environment as mere trustee duty. In terms of defining different green business activities, environmental orientation should be considered.

4.4 Initial Business Plan and Entrepreneurial Intentions

Integrating the entrepreneurial dimension in the mappings requires initial business plan and entrepreneurial intentions to be included. The initial business plan is used to determine whether the nascent entrepreneurs had a green business strategy ever since the beginning. The entrepreneurial intentions are related to the initial business plan, but are more focused on the entrepreneurs’ intentions in product and service development. Consequently, these criteria are used to distinguish between “*green business*” and “*green-green business*” as emphasized by Isaak (2002). Companies whose products, processes and services are designed to be green from the start are labelled “*green-green business*”, as opposed to “*green-businesses*” which gradually are moving towards environmental responsibility (section 0). Table 5 shows the enterprises response on the statement related to initial business plan.

Table 5. Enterprises response to following statement: “Environmental performance was an important part of the initial business plan” (N=437).

Response	Number of enterprises	Percent of enterprises
Agree	55	12%
Partly agree	63	14%
Neutral	116	26%
Partly disagree	42	9%
Disagree	169	38%

The numbers in table 5 are fairly similar to the figures in table 4, indicating a high degree of correspondence between the enterprises initial business plan and their core activity. Additionally, 18% report that the company/entrepreneurs had a definite goal of developing and commercializing environmental goods and services, while 19% report that their goods or services had unintended environmental benefits.

Finally, the distinction between “*green business*” and “*green-green business*” is important as the strategies, barriers and drivers involved are likely to differ (section 0). Including these considerations is therefore necessary to identify the particularity and distinctiveness of ecopreneurship.

5 The Volume of Ecopreneurship

The discussions in the preceding sections shows that green business activities is fairly common in one way or the other, and illustrate the need to differentiate between types of green business activities. Hitherto, the literature often fails to discriminate between ecopreneurship, green enterprises, environmental sectors and similar concepts. Accordingly, this

section employs the survey data and discussions in the previous sections in an attempt to identify the volume of ecopreneurship in the myriad of concepts related to the green economy. The discussions in section 0 & 0 highlights the need to consider multiple causations in determining ecopreneurship, thus the operationalization of the concept is in this connection based on a cross-checking of the different determinants considered in the paper. Focusing on single determinants face the risk of missing out important traits related to start-up, environmental orientation or internal organisation of enterprises. Consequently, it is important to isolate those enterprises that can be identified as ecopreneurial according to all the parameters discussed in section 0. Additionally, cross-checking also ensure consistency in the responses, increasing the validity as all the questions intend to measure ecopreneurship (McLafferty, 2003).

In terms of turnover, companies that report more than 51% turnover from environmental goods and services, as well as enterprises that currently are commercializing are included (section 0). Secondly, companies who report (5) *agree* or (4) *partly agree* on application of environmental goods and services are included (section 0). The third and fourth cross-checks is environmental orientation and initial business plan and is based on the same logic and terms as application of environmental goods and services (section 0 & 0). However, it is possible to discriminate between enterprises that fully agree and those who partly agree depending on the rigidity in mapping, as shown in Table 6. Finally, intentions in product development is included, however the most rigid terms only include entrepreneurs that had a definite goal of developing and commercializing environmental, in contrast to the less rigid terms that also include unintended development (section 0).

Table 6. Number of enterprises that meet all the requirements in the cross-checking's. The first row represents a less rigid requirement than the second row.

Turnover Statistics	Application of Environmental Goods and Services	Environmental Orientation	Initial Business Plan	Intentions in Technology and Service Development	Number of Enterprises
< 51% or commercializing	4 or 5	4 or 5	4 or 5	Planned, unintended or other	16
< 51% or commercializing	5	5	5	Planned	20

Table 6 shows the number of enterprises that meet all the requirements in the cross-checking. In total, 36 out of 437 enterprises are identified as ecopreneurial, equalling 8,2% of the respondents. Additionally, it is possible to subdivide the percent of ecopreneurs based on rigidity in the mapping. The most rigid mapping identifies 20 ecopreneurs, equalling 4,6 per cent. Including the less rigid mapping increase the number by additional 16 enterprises, resulting in the total number of 36 ecopreneurs.

6 Conclusion

This paper is based on a critical reflection on the system of concepts found in the ecopreneurship research and related literature. Based on a theoretical and methodological discussion of the approaches involved in measuring ecopreneurship, this paper presents empirical data to illustrate the possibilities, limitations and challenges related to the different approaches. By suggesting a more rigid approach, the paper further argues that ecopreneurship should be conceptualized as something distinct from other green business activities, or simply entrepreneurial processes within environmental sectors. Moving towards a more stringent cross-checking of variables, instead of focusing on single determinants is a possible solution to identify ecopreneurship. It is further suggested that businesses operating in "green sectors" should be excluded in favour of enterprises that are making conventional businesses "green". This approach is likely to influence the entrepreneurial process in terms of stakeholder interactions, knowledge production, identification of market opportunities and other qualitative differences.

A better understanding of the concept is necessary in order to establish ecopreneurship as a feasible research field in the future, and will eventually lead to policy implications as the field matures.

Finally, the suggested approach has certain limitations and should be considered as an initial contribution shedding light on some focal points related to measuring ecopreneurship, rather than a complete framework.

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Tangibilizing the Service Concept of the Nordic Network of Applied Imaging and Analysis

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The purpose of the paper is to gain understanding of creating and tangibilizing a networked business model of five public research laboratories. They are providing materials' imaging and analysis services as a Network to assist growth-oriented high-tech SMEs in their product development. An EU-funded project is used as a case to demonstrate the challenges and opportunities of using service design thinking tools and principles in a b2b context. These tools proved useful in tangibilizing the networked business model for the service providers. They were also useful in creating the content and structure for the Network website, where appropriate strategies tangibilize the services for customers

1 Introduction

Companies as well as research institutes and universities are becoming increasingly aware of the need and even the necessity to join forces and work collaboratively, not only with their customers but also their competitors; hence, the current UNELMA Project case and the present paper. Our purpose is to address the process of creating and tangibilizing a networked business model and a service concept by using visual tools of service design in b2b (business-to-business) service business development contexts. We will thus test how service design tools can be applied for concretizing, making sense and communicating business models of networked services. This interest arises from a need to facilitate the building of local networks. The objective of this study is to gain more theoretical understanding of networked business models in university and research institute contexts in Finland and Sweden. We are also interested in testing tangibilization strategies in this context. Kindström et al. (2012) discuss the difficulties of visualizing service marketing and the importance of this visualization in a marketing situation where the balance of firms' offerings is changing towards increased service content.

In using service design tools in this high-tech b2b context, a strong emphasis will be on value, as the theories of value creation and service experience are at the core of service business development and co-creation (Vargo; Lusch, 2004; Grönroos, 2011). The main research questions of the present paper are: 1. How to design and tangibilize (i.e. concretize) a networked business model on the basis of a joint service concept in order to provide collaboratively high-tech R&D services to b2b customers; 2. What are the main challenges and opportunities in using service design (SD) thinking and methods in such a process? The research sub-questions that will be answered by the case study are the following:

- What are the opportunities and challenges in creating a joint service concept from service providers' and customers' perspectives?
- What are the most critical phases/touchpoints in the customers' service process?
- How do SD tools help in creating a networked business model?
- How can a joint value proposition and productized service be created using SD tools?
- How can a joint service be tangibilized and visualized online?
- What kind of tangibilization strategies are the most relevant in the customer service process of the current university-based laboratories?

The present paper bases on an Interreg-funded project (2012 - 2014) as a case study that will be used to demonstrate what types of visualization strategies, narratives and metaphors are needed to tangibilize a networked service and thus complete the life cycle of a joint service creation process. This allows us to gain understanding of the critical success factors of such a process, our current focus being on its creation phase. The main aim of the UNELMA Project is to promote economic growth in the Bothnian Arc area by rendering locally available R&D services more easily accessible to SMEs' product development. The concrete aim is to develop a jointly operated materials' imaging and analysis service concept based on the micro- and nano-technological research equipment of the universities and research institutes on the coast of the Gulf of Bothnia between Finland and Sweden. The equipment is needed in the development of new materials and products (see Vuorela et al. 2013 for more information). More information about the context and data will be provided in chapter 3 below.

2 Theoretical background

As is discussed by Vuorela et al. (2013), using visual service design thinking tools in the exploration phase of a b2b service design process not only concretized complex service business-related issues, but also helped to build trust among the partners aiming to create jointly a networked service concept. In our present paper, the focus is on, not only

creating, but also tangibilizing, i.e. concretizing (see Berry; Clark, 1986), a networked business model for both the service providers and customers. We will start by reviewing of relevant theoretical issues of b2b service context and will then move on to discuss networked business models and their tangibilization.

2.1 The context of b2b (business-to-business) services

Scholars (e.g. Gummesson and Polese (2009) point out that, although the b2b context has its special features, it is not a separate 'island'. They see b2b, b2c, c2b, c2c as interdependent: the actors form networks that apply to different marketing and consumption situations (ibid). The outcome of such thinking is that services are seen through both suppliers' value propositions and customers' value actualization. This is supported by Vuorela et al. (2013), who successfully applied service design in b2b high tech contexts; service design has traditionally been used in b2b contexts more often. Yet, it is undeniable that b2b contexts are challenging; e.g. KIBS (knowledge-intensive business services) contexts have been found to require that service innovation processes are linked with the process of service delivery (Toivonen et al., 2007). When identifying the value propositions of business customers, particularly for high-tech, innovative products, scholars have found that decision-influencers value different elements during different stages of the purchasing process (Lindgreen et al., 2009). Attention should also be focused on different service- and supplier-related elements of value (ibid).

Generally, the service function should be seen as a management concept which is viewed holistically (Kowalkowski, 2011a). Within a company, the service organization may be a key entity; yet other organizational entities such as accounting and invoicing also have a role to play in the service business (ibid). When managing different customer segments with different value propositions, it is important to communicate the value propositions of a company effectively and strategically (Kowalkowski, 2011b).

2.2 Building networked business models

Generic elements of business models have been identified in the field of technology-based services by scholars (Palo; Tähtinen, 2011) who have built a framework of the elements of networked business models with a set of generic core elements, with the intention of assisting the building of such business models in practice. They emphasize the importance of three aspects of such business models, namely, the network of actors, the dynamic nature of the business model and the modularity of services (ibid). Business models have been found to be useful in multiple ways; they act as an analytical device for the actors to use in their service business activities, particularly in the case of emerging technology-based services (Palo, 2014). They can also be used as narratives and structures in order to stabilize and develop business activities (ibid).

When building networked business models, it is important to investigate the different stakeholders' expectations and the perceived value for the actors during new service development processes (Makkonen; Komulainen, 2014). Emerging needs and technologies and their matching also need to be identified; this matching process builds on the interaction between networked actors. Lucrative value propositions are more likely to arise through networked actors' individual motives to leverage value-in-context, rather than approaching future stakeholders with product- or technology-based arguments (ibid).

When outlining practical activities that can help companies reconcile different actors' perspectives, scholars have found that a fit is required regarding core content, operations and processes, customer experience and value of solutions (Hakanen; Jaakkola, 2012). The degree of competition of the suppliers and the clarity of their role division and their rapport, in general, have a bearing on the successfulness of co-creation of networked production of services (ibid). The customers' preferences for participation in the service development processes are also important (ibid).

2.3 Tangibilizing business models and services

Value is an important part of service business development, and hence requires special attention when attempting to render new service concepts more tangible for networked service providers and customer companies. Most suppliers have traditionally focused on *product-based value*, and are thus good at visualizing such value parameters as product performance, quality and price, which are typically order winners (Kindström et al., 2012) and are where many firms still tend to put heavy emphases.

Service-based value is more difficult to evaluate and quantify than product-based value. Such values are intangible and are thus harder to visualize (Grönroos, 1997). These values are often gained by customers for free; their typical parameters include operation costs, customization and performance consistency (ibid). Services can also be classified on the basis of their *relationship-based value*, that is how the supplier and customer maintain their relationship over time (ibid); ideally this collaboration enhances competitiveness (Wilson; Jantrania, 1994). Relationship-based value is difficult to tangibilize. Trust, longterm commitment and pro-activity are typical value parameters of relationship-based value (Wilson; Jantrania, 1994). Communicating the value of product offerings has been relatively easy with a fact-based documentation strategy. With companies extending their service provision, what to communicate, and how to go about it, is becoming more challenging (Kindström; Kowalkowski, 2009). Using a service offering life cycle with the following stages can be helpful: market sensing, development, sales, delivery (ibid).

Regarding further strategies suppliers can use in order to create and communicate value to customers in b2b markets, Anderson et al. (2007) propose three different strategies:

- 1/ listing all potential benefits suppliers believe their offering can deliver to customers;
- 2/ recognizing favorable points-of-difference, with suppliers acknowledging customers' alternatives and listing differentiating points between their own and competitors' offerings;
- 3/ communicating the benefits customers really appreciate and need, i.e. a resonating focus, which is difficult to manage – as it requires the most customer and competitor knowledge – but has the greatest potential (ibid). In the context of service offerings, it is important that firms align their communication with their customers' actual needs, rather than simply list all potential benefits (ibid). Orienting towards a more resonating focus in customer communication is the best option (Wilson; Jantrania, 1994).

Besides recognizing different viewpoints for value management and communication as presented above, scholars propose four (4) tangibilization strategies for concretizing and visualizing the value of services to different actors in different situations (Berry; Clark, 1986; Mittal, 1999; Hill et al., 2004; Kindström et al., 2012): 1. *envisioning*: using cues to make customers experience the service mentally, 2. *association*: linking an object, place or person with a service, 3. *documentation*: providing information about consumption, system or performance of a service; 4. *representation*: focusing on attributes of the service. Besides the service offering life cycle, the focus of visualization strategy can also be on the performance episode of the service or the service consumption episode (ibid). Kindström et al. (2012) combine the research on visualization strategies and the offering life cycle in order to show how companies can use visualization strategies; this is deemed necessary as suppliers need to find new and persuasive ways to develop unique selling points.

In an attempt to address the challenge of rendering value more tangible, attempts have been made to facilitate the meaningful participation of people without specialist business training in discussions about innovative service offering and its business viability (Mitchell; Buur, 2010; Buur; Mitchell, 2011). Business modelling can be enlivened by bringing into it three- dimensional elements. Such tangible business modeling can include not only business model canvases (Cf. Osterwalder; Pigneur, 2010), but also dynamic physical artefacts to represent components of a business and important relationships with other entities. Such interactive physical representations of the processes by which a company creates and captures value are intended to provoke discussions between people with different professions and interests (Mitchel; Buur, 2010). Bringing 3-D elements into co-creation workshops is frequent practice in service design thinking workshops, through e.g. the use of Lego blocks, but can include other 3-D elements as well when characterizing the concept of service experience.

3 Methods

The objective of the present case study is to get more understanding of the process of creating and tangibilizing a networked business model for a service concept (see Vuorela et al., 2013 on the definition of service concept) of university-based high tech laboratories using visual tools of service design. The new Nordic Network of Applied Imaging and Analysis will offer R&D services for growth-oriented SMEs in the area of the Bothnian Arc. Closer details of the methodology, data, research strategy and process will be provided below in the current chapter.

3.1 Research strategy and process

Besides reviewing relevant literature on networked business models and tangibilization, i.e. concretization, strategies for b2b services, we have used case study strategy and action research approach. Throughout the research and development process, we have applied the methods and principles of service design thinking: user-centeredness, co-creation, sequencing and a holistic view of the customers' service journey (for more information, see Stickdorn, 2011; Vuorela et al., 2013). In our research approach of action research, we are developing the R&D services of the Nordic Network in iterative phases of action and reflection. We have facilitated workshops with visual tools, such as service blueprint, idea tree, business model canvas, value proposition canvas, productization canvas and other relevant co-design tools (see Table 1 below), in order to gain understanding of the needs of relevant customers, as well as the activities of the service providers, namely research organisations.

In this paper, the main focus is on the creation phase of the process of designing a service concept prototype. We have described the exploration phase of this service design life cycle in a previous paper (Vuorela et al., 2013). In this research process, high-tech companies as customers and the network of service providers are problem owners, as they have experience-based knowledge about their actual contexts (for more information about the roles of action research participants, see Ballantyne, 2004). We have attempted to integrate customer company staff into service development throughout the process.

Diagram 1 below summarizes the empirical research process of the case study during the creation phase, as well as the theoretical aims of the study in the present paper.

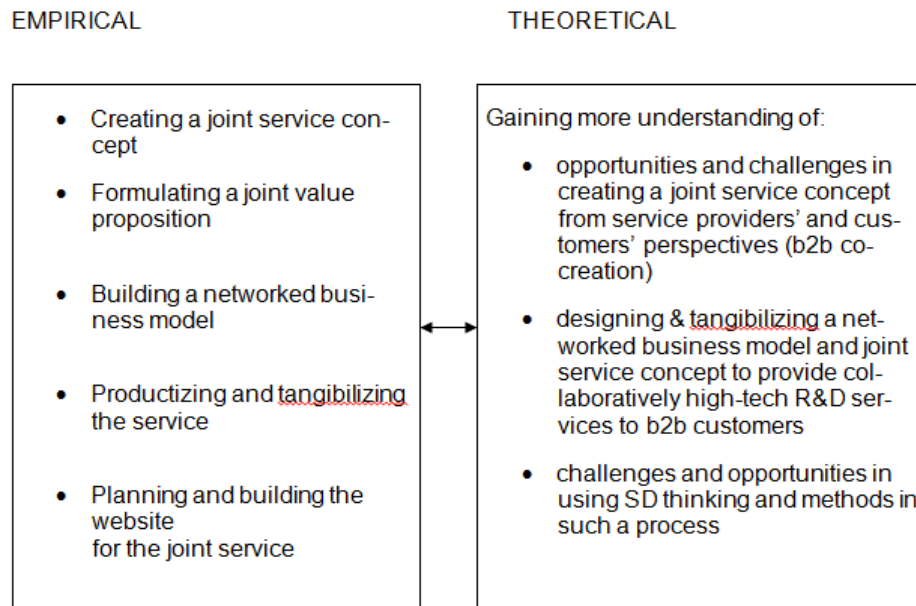


Diagram 1. The research process during the creation phase of the UNELMA Project case.

This study can be called an illustrative case study; via the case, we attempt to gain understanding which extends beyond the current UNELMA Project and its context. An illustrative case study often describes what has already been achieved in practice in (work)life; it offers insight into the nature and form of existing practices (see Eriksson; Koistinen, 2005). The objective is to reveal new and relevant cultural meanings related to the case (ibid). The aim is also to illustrate innovative practices from a b2b context.

3.2 Data description, gathering and analysis

In creating a networked business model for a joint service palette offered by the Nordic Network, efficiency and cost-effectiveness of the b2b high-tech services as well as improved customer experience are the objectives of this service development life cycle. The concrete end results of the UNELMA Project will be, in addition to the new joint service concept (UNELMA Project Plan, 2011), inter alia, improved dissemination of micro- and nano-technological research and thus activation of companies in the utilization of this information in their R&D (Vuorela et al., 2013).

The micro- and nano-technological equipment of the research laboratories of the Nordic Network is expensive. The UNELMA Project will improve the availability of the materials' imaging and analysis services by offering a combined palette of these services and the devices, facilities and staff expertise of the participating partner universities and research institutes. The services will be conceptualized so that the service providers will function as one big networked laboratory and service cluster (UNELMA Project Plan, 2011; Vuorela et al., 2013).

The workshops and meetings were the main sources of data gathering for the case study. In data gathering, we have used participative observation, which has been aided by voice-recording and photography, meeting and workshop documents, journals, diaries and notes that have been written both during and after the workshops and meetings. The data, which is available to us as researchers from the UNELMA Project is archived offline and online. The following workshops and meetings took place between September 2013 and September 2014:

- Exploration Workshop 2a with Finnish Customer
- Exploration Workshop 2b with Swedish Customer
- Creation Workshop 1: joint service
- Steering Committee (PSC) Meeting 3
- Visit to TAKOMO Enterprise Development Centre
- Creation Workshop 2: website
- Creation Meeting 1: website
- Creation Meeting 2: website
- Closing meeting: PSC & Operational Management Team (OMT)
- Visit to Luleå Science Park Business Breakfast

Systematic documentation has taken place during the different phases and the work packages of the project. The analysis of the results of the workshops and meetings has been done by the OUAS team as service development facilitators and researchers as well as all OMT meeting participants together discussing the themes arising from the material. In reporting the findings, pictures will be used to visualize and verify our actions, results and interpretations (see Tables 2-4 below in chapter 4).

The tools used in the service creation process and the motivation for why they were used in the current project (and study) will be briefly described below in Table 1.

Table 1. Tools used in the service design process of the Nordic Network of Applied Imaging and Analysis Services.

TOOL USED IN SERVICE DEVELOPMENT PROCESS	DESCRIPTION	MOTIVATION
Idea Tree: a large poster with a picture of a tree with branches spreading on both sides	Idea Tree presents the thoughts of both service providers and customers; gives a solid background to challenges at hand (Johnson; Schneiderman, 1991). One side of the tree is for the thoughts of service provider and the other for customer opinions. The branches are named with topics which encourage the representatives to think of their values, needs and challenges (Aro et al., 2012. See also Hyysalo, 2009; Hämäläinen; Vilkkä; Miettinen, 2011; Miettinen, 2011).	The main aim was to gain more customer understanding. Idea Tree is a discussion tool. Five questions were formulated on the basis of the current business relationship, to which both sides responded: 1. How do we see the future?; 2. What do we expect and hope for?; 3. What are the challenges?; 4. What is best?; How can we improve our collaboration?
Business Model Canvas (BMC)	BMC is a management tool for describing, analyzing and planning a company's business strategy (Osterwalder; Pigneur, 2010).	Understanding customers' business strategy is necessary for service providers' service business creation.
Service Blueprint	Shows physical evidence for customer interaction/action, visible employee contact/action onstage, employees' internal contact/interaction/action backstage (Zeithaml; Bitner; Gremler, 2006).	Gaining information of customers' service processes and the ways that they interlink with service providers' processes; reveals critical points in the service process.
GOP-brainstorming	A brainstorming tool adopted from ZOPP/GOPP method (http://web.mit.edu/urbanupgrading/upgrading/issues-tools/tools/ZOPP.html).	Verbalizing challenges and possibilities of current joint service creation process; created shared understanding by Network partners.
Value Proposition Canvas (VPC)	VP is a promise of value to be delivered by service provider to customer; applies to products and services. VPC describes how organisations' products and services create customer gains and benefits (Osterwalder; Pigneur, 2010).	Forming common understanding of the value of new service Network for customers
Productization Canvas (PC)	A marketing/business development tool adapted from www.hasardi.com ; was modified for current study/process.	Enabled combining essential business and marketing features of the new networked service concept.
Canvanizer of Nordic Applied Imaging Network	BMC in a digital format www.canvanizer.com	Enabled creating a shared view of new networked business model on the basis of the workshops.
Service Palette	Visualization tool of joint service; colour-coded analogy of service offering.	Created for internal and external marketing of the new networked service concept.

During the exploration phase of our research and development process, we gained understanding of the business situation and context of the Nordic Network of Applied Imaging and Analysis Services and the relevant high tech domain: customer profiles of the different partner labs and the value propositions that the labs offer to their customers (see Vuorela et al., 2013). We collaboratively drafted customer journeys and service blueprints with the partners and their customers; also the partners shared relevant information about their current service business logic (ibid).

A key achievement of the exploration phase of developing a joint service concept was the creation of trust between the partners. In this process, the co-creation workshops were an important element, as information was shared about the partners' service processes – both their challenges and success stories and the business models behind the services (ibid). Hence, when moving from the exploration phase of the service development life cycle to the creation phase, we continued using visualization tools; partly similar tools with a new angle, partly new tools (see Table 1 above) in order to tangibilize the networked business model being created for the partners taking part in the work.

As is shown in Table 1 above, in the workshops, with the help of different visualization tools, we created joint value propositions for the networked business model of the joint service concept. We also identified service provider and customer views on the challenges and opportunities of the new networked business model. Essential elements for the joint production of services were also identified. We will now turn to discussing the findings of the action research of the case study, the UNELMA Project.

4 Findings

Service design thinking as an approach to service development has been applied in the context of the UNELMA Project (for more information of the exploration phase of the service design life cycle, see Vuorela et al., 2013). This approach and its relevant visualization tools not only tangibilize the joint service concept in the making for the network of service providers, but also enabled the creation of trust between the partners, which is a prerequisite for a networked business model (see Vuorela et al., 2013; Hakanen; Jaakkola, 2012). The objective of the present case study has been to gain more understanding of the process of creating and tangibilizing a networked business model for a service concept of university-based high tech laboratories. Although the main focus in the present paper is on the creation phase, we will start by briefly outlining the final findings of the exploration phase, as they involve customer input which is crucial for the creation phase of the service design process.

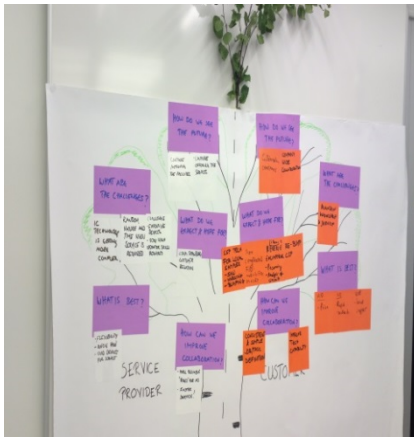
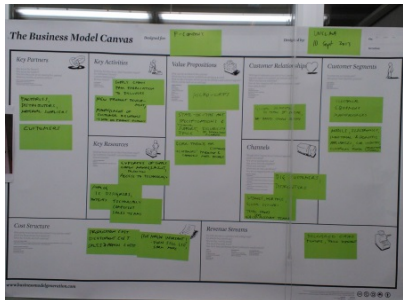
4.1 Results of customer co-creation during the exploration phase


In customer co-creation workshops, service design thinking methods were applied in order to gain more understanding of customers' business strategies. The work was complemented by collaborative analysis by project partners, i.e. service providers, that took place in Operational Management Team (OMT) meetings of the UNELMA Project.

Idea Tree

As is described in Table 1 above, the Idea Tree is a discussion tool, and through it both the service providers and the customers were able to express their viewpoints on the current collaboration and their hopes for the future in a more interactive manner that would have been the case in an interview. For a summary of the results of the Idea Tree of a Finnish customer and service provider, see Table 2 below. There are differences in the customers and service providers' concerns, although they both are hoping for a long-lasting business relationship. The contributions of the co-creation workshops with customers are briefed in Table 2 below.

Table 2. Extracts of results of the customer workshops and related OMT meetings of the exploration phase.

UNELMA Project Workshop TOOLS	PICTURE OF TOOL OUTCOME	CUSTOMER COMPANY VIEW	SERVICE PROVIDER VIEW
Idea Tree		<p><u>Best</u>: price, rapid feedback, local support</p> <p><u>Future</u>: collaboration continues company-wide</p> <p><u>Hope</u>: longstanding customer relationship</p> <p><u>Improvements</u>: faster & more reliable service</p>	<p><u>Best</u>: flexibility, know-how, devices</p> <p><u>Future</u>: continue improving facilities & offering services</p> <p><u>Hope</u>: wider service offering</p> <p><u>Improvements</u>: more tech capability; simple task definitions</p>
Business Model Canvas		<p>Customers are interested in long-standing business relationships and are interested in discussing their business model in the hope that it will improve the efficiency of service providers' service delivery.</p>	<p>Nordic Network learned important information about customers' gains and pains: e.g. cost structure, revenue proposition, customers, partners.</p>

UNELMA Project Workshop TOOLS	PICTURE OF TOOL OUTCOME	CUSTOMER COMPANY VIEW	SERVICE PROVIDER VIEW
Service Blueprint		Customers were able to reveal critical points in the service process to the service provider: time constraints, both points of frustration and contentedness.	Service providers gained awareness of the critical points in the process for the customer. E.g. they experience pressure at different times in the process when compared to service providers' concerns.

Customers' Business Model Canvas

The Business Model Canvas (BMC) is a strategic management tool that is designed to convey the essentials of a company's business strategy quickly and simply in a visual format. It describes the rationale of how a company creates and delivers value (Osterwalder; Pigneur, 2010). The motivation in the current study was to improve understanding of customers' business strategies prior to the creation of a networked business model for the joint service concept. Similarly to the Idea Tree, the BMC allowed discussing issues with the customer company that are delicate as often confidential. The tool allowed the customer to reveal as much information as they felt was possible without the feeling of service providers 'prying' unnecessarily (see Table 2 above for a brief of the outcome of BMC; see Table 1 for an overview of the tool).

Service Blueprints

Service Blueprinting is used for service innovation and development. The tool shows the service process within an organisation divided into different components, such as front stage with visible customer - company employee contacts and customer action, back stage with invisible employee action (Zeithaml et al., 2006). Through it, the service providers were able to establish critical points of their service for the customers (see Tables 1 and 2 above for more details).

The information gathered in customer workshops in Finland and Sweden benefitted the service creation process of the joint service concept. The Network will be able to attend to customer requirements more effectively after this collaboration, even though all customer wishes may not be within the scope of the networked offering.

4.2 Results of the creation phase

The creation phase of the service design life cycle started in the autumn of 2013 after the exploration workshops with customers had been completed. The first creation workshop amongst the project partners involved working with several visual discussion methods: GOP brainstorming, Value Proposition Canvas, Productization Canvas (see Table 1 above for details). The work was finalised through the design of a networked business model for the Nordic Network with the help of a digital BMC tool, on the basis of the results of the other visual tools of the creation phase as well as the results of the exploration phase (see Vuorela et al., 2013). The networked business model was approved by the OMT meeting and Steering Committee meeting. The results of the creation phase are discussed below and they are also briefed in Table 3 below.

Goal-oriented brainstorming

The first creation phase workshop started with a brainstorming session about the advantages and challenges of the joint one-desk service policy for the Nordic Network. The discussion method was adapted from the ZOPP/GOPP method (see Table 1 above for more details). The idea was to gain as much information as possible of project partner views through 'free-association' on the basis of a jointly formulated research question, while working with colour-coded notes that were attached to the wall; everyone could see each other's views and contribute to them with own their own hand-written notes.

The project partners identified advantages of a joint service concept for both the service providers and customers but challenges only for the service providers. Had customers taken part in the workshop, the outcome could have been slightly different. Now the project partners were putting themselves into the 'shoes' of potential customers and imagining ideal situations. Of course, they do have customer understanding due to years' of experience as well as the information that was collected in customer workshops (see Table 2 above). Naturally, the joint service concept was seen from a positive point of view: it is the main aim of the UNELMA Project. Generally, the advantages of the networked service were rapidity and reliability with an extensive offering and an efficient back-up system. The challenges involved e.g. combining competition and collaboration amongst the networked service providers (see Table 3 below for details).

Networked Value Proposition Canvas



When embarking upon creating a joint value proposition for the networked service concept of applied imaging and analysis, we had the following research question in mind: How can a joint value proposition and productized service be created for the Nordic Network using service design thinking tools?

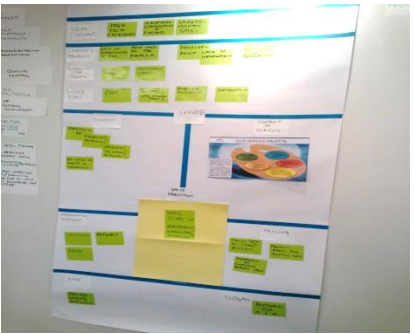
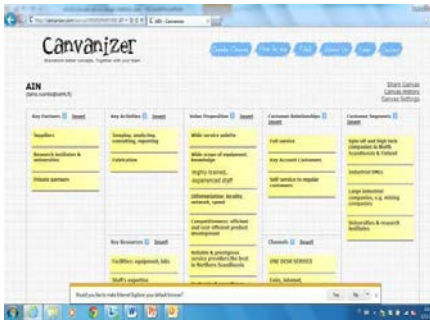
The starting point for the work on the joint value proposition was the Business Model Canvas (BMC, Osterwalder; Pigneur, 2010; see also Vuorela et al., 2012), which defines value proposition as a promise of value to be delivered to the customer company as an entire organization, or part of it. Thus, the Value Proposition Canvas (VPC) describes how a service provider's services create customer gains and benefits (Business model generation, 2010; date of retrieval 29.7.2014; for the Value Proposition Canvas (see http://www.businessmodelgeneration.com/downloads/value_proposition_canvas.pdf)

The VPC discusses 'customer jobs', 'customer pains', 'customer gains' and finally 'gain creators' and 'pain relievers' (ibid). The identified issues are project partners' opinions of what customers' concerns are (based on their own experiences and customer co-creation workshop during the case study, see Table 2 above). E.g. *pain relievers* involve the Nordic Network Service Palette (see Table 4 below in chapter 4.3), which was decided upon prior to the current case study.

For more information on the VPC content, see Table 3 below.

Table 3. Results of the workshops and related meetings of the Creation phase.

UNELMA Project Workshop TOOLS	PICTURE OF TOOL OUTCOME	RESULTS IN BRIEF
GOP-brainstorm		<p>Opportunities of joint one desk policy for Customer: one contact point; fast, reliable service; back-up system; fair pricing</p> <p>for Service Provider: shared know-how of capability & resources of partners.</p> <p>Challenges for Service Provider: competition; admin of new customers, distribution of work, pricing, communication.</p>
Value Proposition Canvas (VPC)		<p>Customer Pains: e.g. time of research/analysis for critical products and processes; uncertainty of core problems with products and processes; loss of customers due to production problems.</p> <p>Customer Gains: more competitive thanks to reliable analysis results; no need for analysis equipment investments; access to expertise and 'top- notch' equipment.</p> <p>Gain Creators: via new networked service concept, customers develop better products with shorter time to market.</p> <p>Pain Relievers: Nordic Applied Imaging Network is a 'public' player: offers impartial analysis results.</p>

UNELMA Project Workshop TOOLS	PICTURE OF TOOL OUTCOME	RESULTS IN BRIEF
Productization Canvas (PC)		<p>The Productization Canvas crystallized the information obtained with the above VPC.</p> <p><u>Value Proposition</u>: wide scope of equipment, knowledge & services; <u>Differentiating Features</u>: locality, network, speed; <u>Ideal Customers</u>: growth-oriented high tech SMEs in Northern Scandinavia and Finland.</p>
Networked Business Model Canvanizer		<p>BMC for the Nordic Network of Applied Imaging and Analysis was compiled on the basis of the above tools' output and it was approved by the Project Steering Committee meeting.</p>

The VPC tool seemed slightly repetitive in the workshop and yet through it the service providers did efficient brainstorming 'gymnastics' about and around their future networked business model.

Productization Canvas for the Nordic Network of Applied Imaging and Analysis

The UNELMA Productization Canvas was adapted from Hasardi Productization Canvas (Lapinlahti; Vesala; Törmänen, 2013) and was used as a tool for specifying and standardizing the networked service offering of the Nordic Network. The canvas was adapted for our purposes as this helped to concretize the service offering. It crystallized the work that we had achieved through the other tools. With its help, ideal customers and their problems were defined: high tech companies in Northern Scandinavia and Finland; growth-oriented SMEs, whose activities suffer from the lack of understanding the root cause of problems in their manufacturing processes. They also lack the necessary equipment. The service providers' opportunities for selling were also identified as well as customers' buying risks and benefits. The core value proposition was defined as well as differentiating features. Finally, principles of pricing were discussed. Crystallizing the service content through the Productization Canvas facilitated embarking upon the tangibilization process of the joint service concept for the customers, namely the design of the website of the Nordic Network (see 4.3 and Table 4 below).

Networked Business Model for the joint service concept

Finally, on the basis of the creation workshop outcome, a networked business model for the Nordic Network was created by the OUAS facilitator team, which was then presented for the OMT meeting to be discussed and finally approved. The focus at this stage was on the customer segments, value proposition and the channels (see <http://canvanizer.com/canvas/OGUVjXNif57JN30XkFIdjZLrBNmXUJXj>), which lead us to the next stage in the tangibilization process, as already mentioned above: the website for the joint service concept.

4.3 Tangibilization strategies for the website of the Nordic Network

The Nordic Network of Applied Imaging and Analysis undertook several workshops (for their outcomes, see Tables 1-3 above) in order to develop a networked business model for the joint service efforts. In the context of the current research and development project, an effort was made to benchmark the digital marketing of several commercial competitors in the field of high-tech analytical services. It is evident, on the basis of this benchmarking, that websites are seen as an important part of the process of delivering high-tech B2B services. The benchmarked companies emphasized the following factors in their digital marketing, inter alia: their trustworthiness, independence, experience and high educational level of their workforce. This is in line with standard B2B services marketing, which relies on quality, value, skills and personal characteristics of the workforce.

The Nordic Network of Applied Imaging and Analysis website, its content and structure of navigation are the concrete outcome of the work that has been completed during the UNELMA Project case during workshops and meetings in 2012-2014. Several workshops and meetings were needed (see p. 7) when building the guidelines for the website, which is still under technical construction at

<http://webcgi.oulu.fi/nano/unelma-www/>

and will be finalised in the autumn of 2014. The services of the network have been particularly challenging to describe for the website. In order to find the relevant strategies that could help to tangibilize the services of the Nordic Network for the customers, the following sub-research questions for the creation workshop and meetings on the website were drafted:



- How can a joint service be concretized, tangibilized and visualized online?
- What kind of tangibilization strategies are the most relevant in the customer service process?

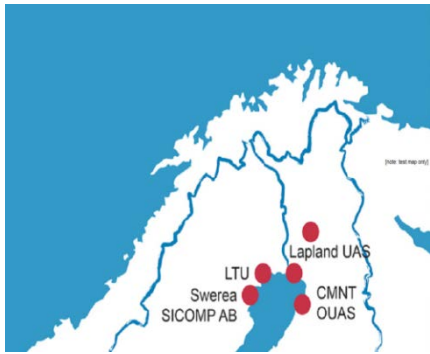
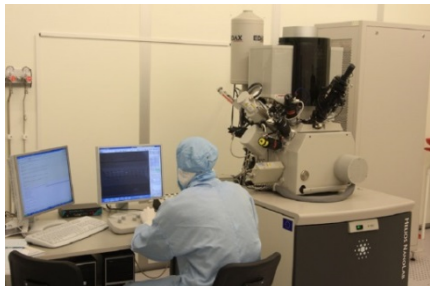
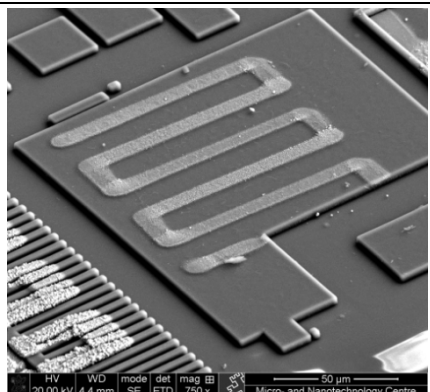
The content of the website was essentially created during the process of creating the service, and it is hence based on the workshops of both the exploration and creation phases (see Tables 1-3 above; see also Vuorela et al., 2013). In practice this means that suggestions for a narrative, metaphors, slogans and keywords were created in and around the workshops and meetings for the technical and graphical staff to be used when technically building the website.

The structure of the website was decided in workshops and meetings of the creation phase during spring 2014; e.g. a decision was made to create a static site with the following navigation bar content: Home, Services, Equipment, Partners, Success Stories, Gallery, Contact Us. The domain name for the website had been approved at the beginning of the UNELMA Project, namely appliedimagingnetwork.eu. The website still requires more material, images and text from all partners, so it is not yet complete. Hence, this online tangibilization process is 'work in progress', and what we are presenting are propositions for tangibilizing the services of the Nordic Network of Applied Imaging and Analysis.

As has been stated above, the co-creation work that we completed as project partners within the UNELMA Project with its visualization tools of the Business Model Canvas, Value Proposition Canvas and Productization Canvas helped to tangibilize the networked business model of the new service concept, under creation, for the service providers. The website that is currently being created for the Nordic Network will tangibilize the service concept for the customer companies and thus improve the delivery of the services. The results of the workshops and meetings of the creation phase for the Nordic Network website for joint service production are briefed in Table 4 below.

Table 4. Tangibilization strategies for the Nordic Network of Applied Imaging and Analysis website.

Network website: TANGIBILIZATION ELEMENT	PICTURE OF TANGIBILIZATION ELEMENT	DESCRIPTION	MOTIVATION FOR USE
Nordic Applied Imaging Network Logo		The logo evokes the physical properties of the micro- and nano-technological imaging processes.	Tangibilization strategy of association (see Berry; Clark, 1986; Kindström et al., 2012).
Service Palette with colour coding		Analogy of the artist's palette demonstrates the service offering. Colours evoke the colours of the physical spectrum; the palette the wide selection of services available. The palette is an artist's tool; the Network also provide pictures, although of a different kind.	Created for internal and external marketing. Tangibilization strategies of documentation and association (see <i>ibid</i>).

Network website: TANGIBILIZATION ELEMENT	PICTURE OF TANGIBILIZATION ELEMENT	DESCRIPTION	MOTIVATION FOR USE
Map of Gulf of Bothnia area where Network is located		The map of the area demonstrates and emphasizes the locality of the services of the Nordic Network.	Tangibilization strategy of association (see Berry; Clark, 1986; Kindström et al., 2012).
Example: Equipment of analysis		The photo depicts an expert member of staff in the process of completing an imaging / analysis process.	Tangibilization strategy of envisioning: helps the customer envisage the service mentally (see ibid).
Example: Result of imaging		Scanning Electron Microscope (SEM) image of integrated circuit surface showing a thin copper conductor line made with direct writing method.	Tangibilization strategy of envisioning: helps the customer envisage the positive outcome of the service: its quality and precision (see ibid).

When visualizing the value of their services, companies can focus on *product-based* value, *service-based* value, *relationship* value (Kindström et al., 2012). When the network partners formulated the value proposition of their joint business model, all of the above were found important: the services are performed with the help of expensive, ‘top-notch’ equipment; the services are locally available and reliable as delivered by ‘impartial’, skilled work force as they are based in universities and research institutes. Also, the network provides services collaboratively, pooling resources and know-how, which is relationship-based by definition. This is suggested through e.g. the map of the Gulf of Bothnia on the Network website, which shows the location of the Nordic Network partners (see Table 4 above).

The tangibilization strategies (Berry; Clark, 1986; Hill et al., 2004; Mittal, 1999) of

envisioning, *association* and *documentation* (for definitions, see chapter 2.3 above) can be seen in the elements of tangibilization that have been chosen for the website of the Nordic Network. Further elements that could be included in the tangibilization elements of the website involve service consumption: depicting activities of customer companies in the service process. Facts and statistics could also be shown related to the service delivery system, at least after the networked business model has been functioning for a while. Reference cases will be an element on the website under Success Stories: some of them could include cost calculations, thus showing the advantages of the Nordic Network services for a customer company. Additionally, after the final results of a customer needs analysis of the UNELMA Project have been received and analysed, more emphasis can be placed on the resonating focus of future potential customers (Anderson et al., 2007).

During the development of the networked business model, emphasis has been put on the importance of visualizing the service offering through its entire life cycle: market sensing, development, sales and delivery as advised by scholars (see Kindström; Kowalkowski, 2009). The following elements as visualization elements should not be forgotten after the Nordic Network starts functioning: joint trade shows appearance, community activities, top management presentations, film sequences, reports, follow-up meetings, statistics, newsletters and stickers (see Kindström et al.,

2012). Additionally, the tangibilization strategy of *representation* could be emphasized, focusing on chosen attributes of the services (see Berry; Clark, 1986).

5. 5 Conclusions and discussion

In the empirical work related to the UNELMA Project, work was carried out for the project: creation of the joint service concept and building a joint networked business model on its basis. A joint value proposition was designed for the Nordic Network of Applied Imaging and Analysis and an attempt was made to productize and tangibilize the service offering. A website for the joint service concept was also planned and created.

The theoretical contributions of the study involved gaining more understanding of the opportunities and challenges in creating a joint service concept from service providers' and customers' perspectives in a b2b high tech context. Vuorela et al. (2013) discovered that a critical factor of a successful exploration phase in a service design process within b2b high tech service contexts proved to be trust. Another critical factor is finding the appropriate means that help the service providers identify the hindrances in joint service development. Joint service development requires open discussions of business models and sharing of information of business contacts and customer understanding in order to create new services together (ibid). These issues were a solid basis also for the creation phase of the service development life cycle, where we gained further understanding on creating and tangibilizing a networked business model and a joint service concept in order to provide collaboratively high-tech R&D services to b2b customers. The tools: idea trees, service blueprints and customer business model canvases (BMC) provided crucial information for the service creation: e.g. the most critical phases and touchpoints in the customers' process. When building the networked business model for the Nordic Network, the value proposition canvas and productization canvas were invaluable discussion and brainstorming tools. They were also important analytical devices for service creation in a b2b case. These tools tangibilized the service concept for the service providers. Investigating carefully the networked partners' different expectations is important in building lucrative value propositions (Makkonen; Komulainen, 2014) and helped the process of building a networked business model. It is important to bear in mind that b2b involves embeddedness of networks of stakeholders (b2b2c2b2c2c) and is rooted in systemic innovation (Gummeson; Polese, 2009). Also, different organizational entities (e.g. invoicing) should be engaged in service functions in order to improve the quality of services (Kowalkowski, 2011a): a future challenge for the current service development.

The creation of a joint website for the Nordic Network proved to be an important element for tangibilizing the new service concept and networked business model for the customers. Service design thinking was useful as an approach in this process as well: co-creation, customer focus, holistic view of the service process. When exploring the tangibilizing strategies for online service marketing purposes, the elements of *association*, *envisioning* and *documentation* proved feasible at the present stage of the Nordic Network marketing (Kindström et al., 2012). In the future, more emphasis could be placed on *representation* (ibid) and finding a clearly resonating focus towards specific focus groups of customers (Anderson et al., 2007). Focusing on the modularity of the services (see Palo; Tähtinen, 2011) may be another important focus for marketing the present networked services. Kowalkowski (2011b) emphasizes the importance of communicating a company's value propositions effectively in a new area. Tangible business modelling through 3-D elements as suggested by Mitchell and Buur (2010) seems promising for co-creation with customers. Other important future directions could involve different types of value propositions for different stakeholders (Lindgreen et al., 2009).

The reliability of the case study results has been addressed through material and researcher triangulation: both quantitative and qualitative material have been exploited and researchers have worked in multidisciplinary multi-person teams, consisting of students and research staff. Ballantyne (2004) points out that the research component in action research means research for the project, not about the project, as projects have their own action-driven research requirements; broader scholarly interests may become fulfilled later (ibid). If engaging in new joint industrial cases, in order to find synergies and new possibilities to boost local industrial companies, the partners need to engage in interactive activities to become acquainted and integrate new potential customers as well. Traditional questionnaires are a challenge in customer integration and workshop attendance requires time, which can be costly for SMEs. Relevant messages through company websites could be a fruitful direction to take in customer engagement. Building tangible websites for networked services can be challenging; the collaboration between staff members who represent different domains and speak different discourses can be time-consuming. Yet, the network partners' views, needs and roles were modified in co-creation workshops. Also, a two-year project improves the quality of the results, as matters mature over time. Interactive service design thinking approach and workshops clarified the roles of different partners in the Nordic Network and thus improved the quality of the collaboration.

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The use of service design tools as ‘boundary spanning objects’ in SMEs

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This explorative study was set up to shed some light on how service design tools and workshops can be utilised in practice as ‘boundary spanning objects’ while developing new, innovative services within SMEs. Although some authors have noticed and emphasises the role and importance of boundary objects in service design (e.g. Kimbell, 2011; Bjögvinnsson et al., 2012), the findings and insights from the ‘boundary object’ literature appear to be largely ignored in service design literature. This paper attempts to mitigate this identified gap within the research literature. In order to provide some answer to the key question of this study, we first carried out a review of existing literature. Building on Carlile (2002; 2004), Bessant et al. (2005), Bessant and Maher (2009), and Kimbell (2011) we then developed a tentative framework to be used as a tool to analyse the empirical data collected from four new service business cases. The empirical data consists of 43 hours of audio recordings, collected during 21 service design workshops that were facilitated by the authors of this paper between December 2012 and April 2014. The main conclusion of this paper is that service design – at least when carried out with “low-tech SMEs” (den Hertog et al., 2011) like in this study – is better suited for the development of more radical innovations, that are taking place at pragmatic boundary (Carlile, 2002) and following “designing for services” approach, as suggested by Kimbell (2011).

1 Introduction

The research of service design has started to take shape (Kimbell, 2011). The literature on service design spans contributions from several research fields, such as service marketing (e.g. Shostack, 1982), new service development (e.g. Bitner et al., 2008), service operations management (e.g. Goldstein et al., 2002) and innovation management (e.g. Bessant & Maher, 2009). Ostrom et al. (2010) suggest that the design of a service may have a significant impact on any or all of the key metrics, such as costs, revenues, customer satisfaction and brand perceptions of the organization producing or delivering the service. Service design is also assumed to have a great potential to make an impact in service innovation (Tether, 2008). It has even been found hard to think about innovation without including design in the considerations (Johansson-Sköldberg et al., 2013).

In her recent study, Kimbell (2011) explored different ways of thinking and understanding service design. Drawing on the analysis of design and management literature and the results of an ethnographic case study, she proposed a new framework that makes a distinction between “*designing services*” and “*designing for services*”. The main difference between these two approaches stem from discussions whether service design is seen as a search process for problem solving that “*aims to work towards a desired state of affairs that can be determined in advance*” (Kimbell, 2011, 43), or as an exploratory enquiry in which the desired end state cannot be known due to unexpected expansions of initial concepts that are integral to a design process (Hatchuel, 2001). Following Manzini (2011), Kimbell argues that:

“...talking of designing for services rather than designing services recognizes that what is being designed is not an end result, but rather a platform for action with which diverse actors will engage over time. Designing for service, rather than designing services, points to the impossibility of being able to fully imagine, plan or define any complete design for a service since new kinds of value relation are instantiated by actors engaging within a service context. Designing for service remains always incomplete (cf. Garud et al., 2008).” (Kimbell, 2011, 45).

Kimbell’s argument seems to be well in line with discussions taking place in the field of service innovation. For instance, the service innovation model presented by den Hertog (2010, 140) consists of six dimensions: 1) new service concept, 2) new customer interaction, 3) new business partner, 4) new revenue model, 5) new delivery system (personnel, organization, culture), and 6) new technological delivery system. Due to this multi-dimensionality the determination of service innovation in advance may be problematic in practise. Moreover, it is sometimes even difficult to define exactly, when and where the innovation process starts and ends (Sundbo, 2008).

Mager (2009) argues that there are still many hurdles to be tackled until service design practices are implemented in organizational structures and roles. One of these hurdles relates on the use of service design in small and medium sized enterprises (SMEs). In their paper, Ward and Dekker (2009) refer to the results of a survey (Design Council, UK) in which 54% of small business managers believed that design would help them to improve the competitiveness of their business during the economic turndown. However, as acknowledged by Acklin (2013), SMEs tend to be reluctant to integrate design into their new product/service development practices. This is explained by noticing that SMEs tend to be risk averse on their business related decisions due to their scarce human and financial resources. It is also possible that SME managers consider the tools too academic and complicated (Sundbo, 2011). Accordingly, Löfqvist (2010) suggests that the high relative novelty (i.e. no prior knowledge or experience) of design methods and tools hampers

their utilization in small companies' design processes and practices. The high relative novelty of service design combined with an increased level of uncertainty make it easy for small business managers to abandon the idea to use design tools and to rely on their own established ways to carry out product/service development.

In this paper we suggest that the concept of 'boundary object' (Star; Griesemer, 1989; Carlile, 2002) may provide important insights to overcome some of identified challenges related on the use of service design methods and tools as a vehicle for new service development in SMEs. Although the some authors have noticed and stressed the role and importance of boundary objects in service design (e.g. Kimbell, 2011; Bjögvinsson et al., 2012), the findings and insights from boundary object literature appear to be largely ignored in service design literature. This paper attempts to mitigate this identified gap within the research literature.

Accordingly, the purpose of this explorative study is to shed some light on this issue by investigating how service design tools and workshops can be utilised in practice as 'boundary spanning objects' while developing new, innovative services within SMEs with little or no prior experience on service design. Moreover, we suggest that service design – at least when the utilization of design methods and tools is organised in SMEs following the 'workshop-approach' like in this study – is better suited for the development of more radical service innovations that often require businesses e.g. to span their innovation search space (e.g. Nicholas et al., 2013) and to manage the critical decision-making interfaces at the fuzzy front end (e.g. Reid; de Brentani, 2004)

2 Literature review

Service design literature provides a large variety of mechanisms and artefacts that can be used in different phases of service development. For instance, Blomqvist (2011) suggests that the purposes of service prototyping may be summarised as exploring (generation of new ideas and insights), evaluating (testing hypotheses to be further developed into a final suggestion or solution) and, communicating (visualization of ideas, facilitating discussion and collaboration between stakeholders). Moreover, service design is suggested to catalyse people to see issues in a fresh way and help them to achieve novel, creative solutions beyond the reach of conventional structures and methods (Meroni; Sangiorgi, 2011; Mulgan, 2014). In addition, Lin and his co-writers (2011) illustrate how service design methods, such as story-sharing, may be utilized to help practitioners not only to design better services innovations, but also to build new organizational capabilities enabling them to implement those innovations in practice. However, Manzini (2011, 4) argue that despite of all progress, service design is so far largely focused on tools and discussion concerning the question: "What do we want to do with these tools?" is still very much in its infancy.

Here, the authors of this paper want to remark that it is also important to notice that service design is not the only discipline that is facing and trying to find some plausible answers to the same (or similar) question presented by Manzini (ibid.) about the practical uses of the tools. Thus, the authors of this paper suggest that it is important to study other relevant research fields and to learn whether there are possibilities for cross-fertilization among disciplines, as suggested by Mager (2011).

For instance, the development and use of various innovation methods and tools are largely discussed within management research literature. Thomke (2006) found in his research that state-of-art development tools, especially those that exploit information technology (e.g. simulation and CAD tools) may increase developer's problem-solving capacity and enhance interaction among developer communities. In a similar way, Gray (2007) discusses how the practice of critical reflection that is facilitated through the application of reflective tools (e.g. storytelling, reflective metaphors, concept mapping) may be used as a purposeful process of exploration and discovery. In addition, Phaal et al. (2007) present a new workshop-based method that uses roadmap templates for supporting the identification and exploration of new strategic and innovation opportunities. Due to the "hands-on" nature of the development process and the extensive use of visual representations, Phaal and his co-authors demonstrate how participants even from very different backgrounds are able to communicate in a more effective way that is explained to be integral element for strategy and innovation development.

Accordingly, Kerr et al. (2013) provide a number of guiding principles (Table 1) to be adapted while organizing workshops that are targeted for developing industrially relevant strategic technology management (STM) toolkits.

Table 1. Guiding principles of STM toolkits (Kerr et al., 2013, 1068).

Human-centric	The STM tools should allow their users to participate, engage and collaborate with one another to have a strategic conversation leading to a co-created solution. The key premise of the tools is to support the social interaction and aid decision-making.
Workshop-based	The recommended mode of engagement for deploying an STM toolkit should be through workshops as they provide the platform for group interaction through structured activities centered on the application of the tools for solving strategic problems.
Neutrally facilitated	The workshops within which the STM tools are to be applied should be facilitated from a position of neutrality whereby the facilitator should be focused on the process and not contribute to the content.
Lightly processed	The process for using the STM tools within the workshops should be applied in a lightweight manner based on the premise of 'start small and iterate fast' and allow for a degree of flexibility by not being too prescriptive. This requires adapting the macro–micro level processes, the divergent–convergent constructs.
Modular	The STM toolkit should be built in a modular fashion with the constituent tools being readily integrated with one another.
Scalable	The tools should have the ability to be employed at the different levels both within and surrounding an organization by employing a scalable hierarchy in order to provide a wide dynamic range.
Visual	The tools should have a visual form for both their application in the workshops and their resulting output for the purposes of reporting and communicating.

The concept of 'boundary object' has gained a lot of interest within research community since it was first introduced by Star (1989). Whereas service design is argued to be located in the intersection of service strategy, service innovation, and service implementation (Ostrom et al., 2010), boundary objects are defined as flexible epistemic artefacts that serve as bridges between "*several intersecting social worlds and satisfy the information requirements of each of them*" (Star; Griesemer, 1989: 393). These objects that may be abstract or concrete by nature are assumed to play important role e.g. in knowledge sharing between different stakeholders and business partners (Koskinen, 2005) and in creation of common ground aimed to lead to shared understanding between occupational communities (Bechky, 2003). Spee and Jarzabkowski (2009) argue that boundary objects are relevant to strategic organizations as these tools enables strategy participants to enhance interaction and to build up bridges over the different hierarchical boundaries and strategic tasks. Furthermore, Nicoloni et al. (2013) provide an illustrative example of how these objects may be used in coordination of cross-disciplinary collaboration in the "ground breaking" for developing a stem cell bioreactor. In this bioreactor project "*boundary objects included the joint papers, shared analytical methods (i.e., design of experiment method), representations of results of the experiments (e.g., in PowerPoint slides), and the bioreactor itself with its constituent elements (i.e., sensors, electronic board, connectors, computer)*" (Nicolini et al., 2012, 616).

Carlile (2002; 2004) provides a framework of boundary objects that consists of three progressively complex boundaries – a syntactic, a semantic, and a pragmatic boundary – and of three progressively complex processes, i.e. transfer, translation and transformation that comprise different approaches to sharing and assessing knowledge across boundaries. Syntactic boundaries are the simplest, assuming that differences and dependencies between actors are known and the domain specific knowledge may be sufficiently assessed and transferred *at a boundary* due to common language or syntax shared by individuals. However, when novelties arrive (e.g. in connection of changes in business environment), syntactical approach may not be sufficient anymore, and then a semantic boundary is faced. This approach is more complex than syntactic because individuals' interpretations on the nature of novel circumstances are often different which make communication and collaboration difficult. Thus, the actors need to learn about their differences and to translate a domain-specific knowledge into a shared meaning that is adequate for the actors involved. The third approach, pragmatic boundary, is the most complex and challenging. As described by Carlile (2004), novelties may generate different interests between actors thus hampering their ability to share and assess knowledge. In order to overcome this challenge, the actors need to develop common interests that are needed in transformation of each other's domain-specific knowledge *across boundary*. However, this often requires significant internal political effort in organizational decision-making.

Bessant and Maher (2009) provide an illustrative example in which these boundary objects and settings are analysed and discussed from the innovation management perspective. More precisely, the authors by drawing on the wider discontinuous innovation literature that has explored the new potential approaches to develop "frame breaking" service innovation by using service design tools as boundary objects within public healthcare. Findings of their study show that service design tools has the potential to provide an efficient way to engage users to act as a co-developers within the innovation process and to get an access even to those latent, "hard to articulate" user needs.

Also Kimbell, based on the findings of her ethnographic study, highlights an important role of boundary objects:

"The designers made an important part of their work the construction of artifacts to make visible and comprehensible the complexities of the service, ranging from prototypes (Case A) to sketches (Cases A and B) to

the customer journey diagrams (all three). These boundary objects (Star; Griesemer, 1989; Carlile, 2002) played an important role in all three cases as the designers tried to make the practices of service stakeholders visible to the managers to help with decision-making about the redesign of the services". (Kimbell, 2011, 48-49.)

However, Carlile (2002) also remarks that an object that is effective at one particular boundary setting may fail and even become a boundary roadblock in another setting. This seems to be well in line with discussions that have been conducted within innovation management literature. Bessant et al. (2005) suggest that under the "steady state" conditions organizations are able to follow the set of rules and systematic procedures (good practices) while scanning new innovation opportunities within known or "knowable" search space. However, when environmental complexity increases e.g. due to introduction of innovative technological solutions brought to market by new entrants, the steady state "good practices" will be challenged. Bessant and his co-authors argue that managing innovation under highly complex environment requires an organization e.g. to carry out parallel experimentation in a open and fuzzy search space by following a "probe and learn" approach instead of trying to manage all plausible risks related on innovative experiments.

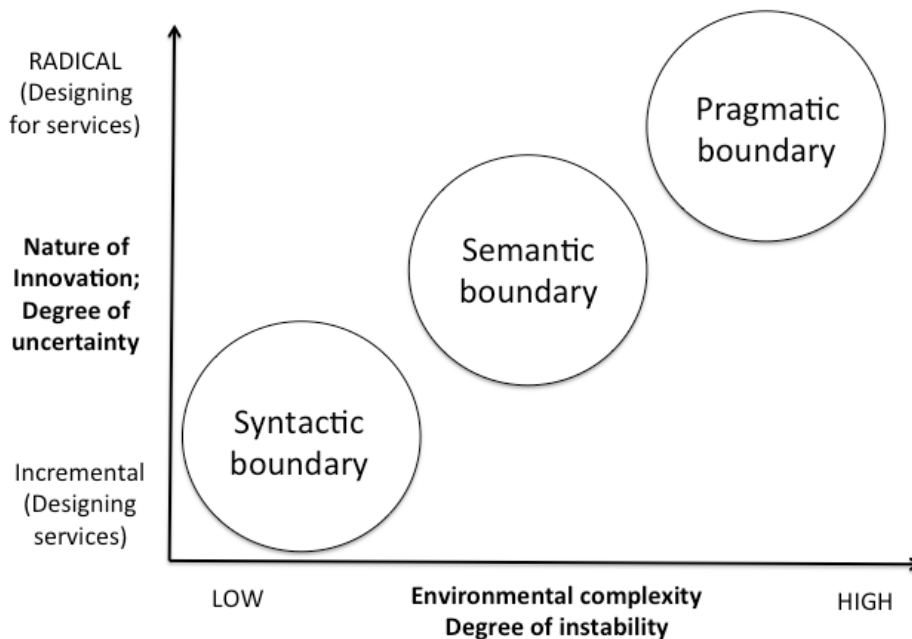


Figure 1. Tentative framework summing up the reviewed literature (adapted from Carlile (2002), Bessant et al. (2005), Bessant and Maher (2009), and Kimbell (2011)).

Figure 1 is a tentative framework sum up some of the discussion within the reviewed service design, boundary object and innovation management literature. The aim of this framework is to provide theoretical background for the analysis of findings of the empirical part of this study. As illustrated on the figure, "designing for services" (Kimbell, 2011) is considered as an example of radical (or discontinuous) innovation due to the open and uncertain nature of this design approach. Moreover, it is assumed that knowledge transfer taking place at a syntactic boundary is more related to the designing of incremental service innovations, whereas radical innovations are based on the knowledge transformation and the development of common interests across pragmatic boundaries. "Designing services" and "designing for services" (Kimbell, 2011) require businesses to span across several mental and organizational boundaries. Service design tools and workshops may assist in this. That is the reason why we chose to use the term 'boundary *spanning* objects' because in our mind, this term illustrates this complex and open phenomenon better than the term 'boundary objects'.

3 Research methodology

The research was exploratory by nature. Thus, a qualitative, multiple case study approach was applied for the purpose of this study because it allows the researcher to understand the studied phenomenon and its context more deeply (Yin, 2003). Three Finnish small and medium sized service companies with little or no prior experience on service design were recruited for this study. The selection of case companies was based on their willingness to explore service design as a driver of new innovative services.

Table 2 provides an introduction to some key characteristics of selected business cases that are named in this paper as 'SPA', 'SPORT' and 'REG' due to confidentiality reasons. Two business cases were developed with SPORT and one each with SPA and REG.

Table 2. Key characteristics of selected companies and brief description of analysed business case(s)

	SPA	SPORT	REG
Year of establishment	1984	1950	2000
Number of employees	120	80	25
Examples of provided services	Hotel accommodation, several restaurants and cafes, spa and well-being services, conference services, guided sport and training activities, etc.	Training centre for top athletes, testing and consulting of athletes, holiday packages for families, accommodation, restaurants and cafes, well-being services, conference services, guided sport and training activities e.g. camps, etc.	Office rental services, business development services, thematic training seminars, testing services for new products, conference services, several restaurants and cafes, etc.
Prior service design experience	None	None	Some
Description of analysed business case(s)	1) Designing for "Arena Service Platform; Designing of new 'PopUp Outlet'-service concept (the first trial of a service concept new to the company)	1) Designing for "The Sport Camp 2.0"-service concept for children; (Gamification); 2) Designing a well-being service concept (incremental innovation, based on existing service modules)	1) Designing a conference service concept (incremental innovation, renewal of existing concept)
Number of workshops	9	8	4
Number of participants in workshops (excluding researchers/facilitators)	2–6	2–8	2–10
Design tools utilized in workshops	Metaphors, "Story building"	Metaphors, personas, Business Model Canvas (Osterwalder; Pigneur, 2010)	Customer survey, customer observation, customer journeys with touchpoints, Innotiimi@OPERA, mock up prototypes, story telling (pitching)

The empirical data consists of 43 hours of audio recordings, collected during 21 service design workshops that were organised at the premises of the case companies between December 2012 and April 2014. In total, 33 people from the three case companies together with their current and potential business partners participated in these workshops, which were facilitated by the authors of this paper. Most of the recorded material was transcribed for later analysis. The data was further indexed, coded and analysed in tabular displays, in which we reused constructs from earlier literature.

4 Results of empirical study

The main objective of this study was to investigate how service design tools and workshops can be utilised in practice as 'boundary spanning ob

jects' in the development of new, innovative services within SMEs. The insights from prior research literature provided a theoretical basis for the study. Moreover, both of the authors of this paper had, in addition to theoretical knowledge, prior practical experience on organizing design workshops and using service design methods and tools during these workshops. Besides, both of the researchers also had an opportunity to participate in a number of other design workshops (mainly targeted for start ups and SMEs) during the research project that were carried out by external service design professionals. All together, we had a solid starting point for our efforts to meet the objectives of this explorative study.

The empirical part of the research project started by organizing a "kick-off workshop" together with key staff members (e.g. managing director, development director) from each of the case companies. At the beginning of these workshops researchers presented the main objectives of the study and provided some illustrative examples of service design tools that may be used during the workshops. Furthermore, researchers also presented a simplified description for the multi-phased process (Figure 2) that was aimed to support the implementation of new service design in the case companies.

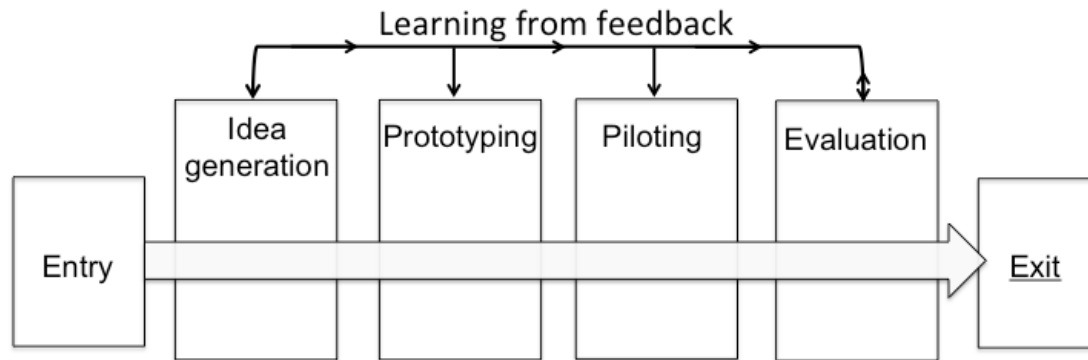


Figure 2. Diagram of a multi-phased design process. The diagram should not be viewed as a linear progression from Entry, through the four phases, to Exit phase with a new complete service. Rather, the multi-phased design process can be cyclical, for example, there may be several cycles between Idea generation and Prototyping phases before the service concept is mature enough for Piloting. The Evaluation phase provides main feedback to the earlier stages. However, at the end of each phase there may be reflection on what was done, and thus learning may be obtained that can be utilized during any subsequent phase.

However, most importantly, these kick-off workshops provided researchers an opportunity to learn more about the selected case companies. For this purpose researchers had prepared a list for the key questions in which we asked them e.g. to describe their typical new service development (NSD) process, what tools and methods they are using in NSD (special interest in the use of service design methods/tools), the recognized NSD related challenges/obstacles, etc. We were interested to find out if the case companies already have some on-going NSD projects that could benefit from our research based activities.

The results of the kick-off workshops showed that case companies did not have any well-structured NSD process in which different development phases are clearly defined. The most typical NSD is based on the “development projects” that respondents from case companies described to cover at least on some level all the main phases of the process presented in Figure 2. The establishment of these development projects may be based on strategic decisions (e.g. SPA had made a strategic decision to allocate resources on the development of new “family services”), but more often, NSD related decisions are made on ad-hoc basis in order to meet new customer requirements or to benefit from the identified business opportunities on the market. Respondents from case companies also pointed out that the limited amount of “spare” human and financial resources hinder the extent of NSD and make it difficult to initiate “high-risk, fuzzy” ideas for new services.

Moreover, it was also found out that the selected case companies had no prior experience on use of service design methods and tools in NSD. Or to be more precise, case company REG did have some prior service design experience – but only as an organiser of events and workshops targeted to assist regional businesses to benefit from service design. Like explained by development director of REG, “We are like the famous Cobbler whose children have no shoes”.

The “entry phase” kick-off events were followed by a varying number of “ideation phase” workshops in which the target was first to identify those service design business cases that the participating companies considered to be the most relevant. While designing the process and content for these workshops, we found it highly useful to follow the guiding principles suggested by Kerr et al. (2013). The only exception was to the “neutrally facilitated” principle pointing out that “...facilitator should be focused on process and not contribute to the content” (Kerr et al., 2013:1068). Here we found it more useful to follow Manzini (2011) who suggests that designer should not only take a role of facilitator (i.e. an actor whose task is to listen and facilitate the discussion) but also act as provoker who provides alternative, even wild and provocative proposals to stimulate discussion during the design process.

So far, we have merely discussed on NSD and service design within the case companies on a general level. However, in order to shed some light for the key question, i.e. how service design tools and workshops may be used as ‘boundary spanning objects’, it is necessary to take a closer look on the four businesses cases – SPORT’s ‘well-being service concept’ and REG’s ‘conference service concept’ – were defined to follow Kimbell’s (2011) “Designing service” approach. Respectively, the two other cases, i.e. SPA’s “Arena Service Platform” and SPORT’s “The Sport Camp 2.0” were specified to follow the “Designing for Services” (Kimbell, *ibid.*) approach.

4.1 Designing new service concepts

The first two business cases, i.e. SPORT’s “well-being service concept” and REG’s “conference service concept” are examples of incremental service innovations in which the desired outcomes are defined in advance (Kimbell, 2001). During the “entry phase” discussions the representatives of both case companies found it interesting to explore what kind of new insights might be generated through service design methods. However, due to determination of desired outcomes in advance, the “search space” (Bessant et al., 2005) innovation was also significantly narrowed down.

For example, the development of SPORT's "well-being service concept" was merely based on redesigning already existing health and nutrition based services. Within the new "service concept", the main idea was to define the already existing services as "service modules". As a result of this "new to the company" service approach, it was considered easier to build up more customer- and user-friendly service packages in a flexible and cost-efficient way. The service design tools used during the workshops were "Personas" and "Business Model Canvas" (Osterwalder; Pigneur, 2010). The participants of the service design workshops consisted of the key staff members from different organizational departments who found the workshops and the use of design tools highly relevant as it enabled a more efficient communication and dialogue between different departments. No external people participated in the design workshops, even if the authors of this paper suggested that it might be beneficial in terms of outcomes of the workshops to have some customers involved. However, the development of "well-being concept" was interrupted before entering the "prototyping" and "piloting" phases. The main reason for this interruption was the lack of financial resources that were needed for furniture and other equipment investments.

In a similar way, the development of REG's "conference service concept" is an example of incremental renewal of existing services. Also here the desired outcomes were well defined from the beginning of design process – the main objective of the business case was to explore how to make conference services more "mobile" and more "visible" for participants of conferences and meetings organized at REG's facilities. During the "ideation phase", we used several service design methods and tools. The design process started with non-participatory observation of customers and a customer survey during three customer events. The findings from observation and survey were then discussed during the "customer journey" workshop that enabled e.g. to identify a number of new ideas and practical measures not only to improve the quality of service provision, but also to take one step forward on the development of a more "mobile and visible" conference service. These ideas were then developed further on the "prototyping workshop" in which we asked participants (working in small groups) to visualize their ideas by building mock-up models (using play-dough and other crafting materials) and to provide a 3-minute long pitching speech to highlight the most innovative elements of their new "mobile and visible" conference service. As REG only manages and coordinates their conference services (the actual provision of conference related services e.g. catering and technical support is outsourced to several external service providers), REG decided to invite some of their external partners to participate in the workshops. However, even though REG evaluated the service design workshops and tools to be highly valuable for them, we were not able to proceed any further on our design process due to organizational changes within REG.

4.2 Designing for new service platforms

As presented on Table 2, the other two business cases, i.e. SPORT's "The Sport Camp 2.0" and SPA's "Arena Service Platform" are examples of service innovations that are following "Designing for Services" approach suggested by Kimbell (2011). What makes these business cases highly interesting for this study, is that both of them are based on the identified business challenge that the case companies have tried to tackle over the years without any remarkable success. Thus, both companies were interested to see whether our research project was able to provide them with new insights that may help them to overcome the identified problems.

SPORT has organized sport camps for children over the 25 years. However, despite of their reputation and expertise, the number of children participating on these "traditional" sport camps has been declining especially over the last five years. This is partly explained by new entrants and increased (partly subsidised) competition that representatives of SPORT described sometimes even unfair during the "entry phase" discussions. To answer these challenges SPORT has enriched their programme by inviting magicians and famous Finnish athletes to visit the camps, but these incremental improvements have not helped SPORT to increase their attractiveness.

When the design process entered to the "ideation phase", the authors of this paper presented SPORT an initial idea that instead of trying to design a new "sport camp service concept", it could be more relevant to follow Kimbell's (2011) "Designing for Services" approach. Accordingly, we presented a provocative idea of "The Sport Camp 2.0" that was described to serve as an open platform for future children's camps. Even though representatives of SPORT described our "Sport Camp 2.0"-idea to be even too radical for them, SPORT was willing to spend time and money for our common exploratory inquiry. Before entering into the "ideation phase" the representatives of SPORT together with researchers decided on two key principles to be used as a backbone of design process. The first principle was that "Sport Camp 2.0" is going to be built on SPORT's nationally recognised reputation and expertise on sports. Secondly, the new service concepts that are designed to be introduced to the market through the "Sport Camp 2.0" platform should be "hard to duplicate" by nature. Following these two principles we first organized a workshop in which we used several pictures and photographs as metaphors in order to facilitate the generation of new ideas. This approach proved to be successful as pictures allowed participants to provide their own interpretations for the "new services concepts" more openly. Following this, some of the most promising ideas were chosen to be discussed with two focus groups in which the participants consisted of 8-13 year old children (who at the same time participated in one of the sport camps) and sport instructors (who carried out the provision of sport related services in the same camp).

At the end of "ideation phase", one of the service concepts, titled "Gamification", was selected to be discussed further. Nevertheless, it should be noticed that rest of the promising new ideas were not rejected, but merely stored in an "idea repository" to be developed further in the future. However, when process was ready to step into next phase, it became obvious the development of "Gamification" prototype is not possible by using the resources of our research

project. Therefore, SPORT decided, based on the insights and findings of the service design workshops, to build up together with external consultant and some start-ups from Finnish game industry a new “prototyping project” funding application to be submitted to the Ministry of Education and Culture who also promotes small-scaled “cross-cultural” innovation activities in Finland. In this way, SPORT also tried to efficiently diminish the risks related to the development of the first service concept to be included on “Sport Camp 2.0” platform.

Respectively, SPA was interested in to find some new insights and potential solutions on their “wicked problem”. This challenge was related on the problematic four weeks long time period in the middle of the Finnish summer holiday season when SPA’s Arena (a large indoor sports hall located next to SPA’s other buildings) did not have any proper use and thus generated only costs to be covered by incomes from other departments. As described earlier, SPA had tried to overcome this problem e.g. by developing new conference services and taking contacts to potential conference organizers, but with little success. During the “entry phase” discussions with SPA representatives it became clear that some incremental improvements do not provide a sufficient way to tackle this problem. Therefore it was decided also here to follow Kimbell’s (2011) suggestion and start a design process that was aimed to designing for new “Arena Service Platform”.

We started with SPA the “ideation phase” service design activities again by presenting pictures and photographs that were used as metaphors to facilitate discussion for new potential service concepts. However, the main service design method that we used during the “ideation phase” workshops was what we started to call “story building”. As “story telling” (e.g. Gray, 2007) and “story-sharing” (e.g. Lin et al., 2011) are described to encourage and facilitate the development of shared meanings, “story building” is an approach that facilitates shared innovation. The “story building” is based on the careful documentation of key points of discussions after each workshop into a single document. In this particular business case, these workshops were organized regularly approximately once per six weeks over the 16 months time period. Each workshop started with the review of last version of “story building” document that was then updated with new key points. Thus, no ideas were lost and the “story building” – as an iterative, reflective process – also enabled us to refresh and to take into discussions even those ideas for new services/service concepts that were earlier put “aside” for some reason. As a result of this iterative and reflective design process, we were able to generate a number of potential service concepts to be included in the “Arena Service Platform”.

In order to proceed to the next phases of design process, representatives of SPA selected one of the most promising, new to the company service concept, i.e. “PopUp Outlet” to be first prototyped and then piloted in a full scale with real business partners and customers. The basic idea was to open a PopUp retail store in the sports arena during the problematic 4-week period, and to have products from nationally recognized product brands for sale at “outlet”-prices. The intent was that the PopUp Outlet would extend the SPA’s service offering for people lodging at the spa hotel, and also invite and attract people from elsewhere to visit the PopUp and at the same time use the spa’s services. However, this posed a real learning challenge for SPA as none of staff had any prior experience on pop-up and outlet concepts. Moreover, SPA also realised that “PopUp Outlet” concept has the highly attractive to raise the interest of national product brands (the main target group) to participate and to invest their time and money for this trial. However, after intensive fieldwork, benchmarking of existing outlet concepts, several workshops and iterative rounds, the first prototype for “PopUp Outlet” was ready to be presented to the potential business partners. This was considered as a real “acid test” as especially the most important partners, i.e. national product brands do have an extensive amount of experience on outlet-sales and pop-up concepts. Thus, it was assumed that these companies would simply say no if the SPA’s “PopUp Outlet” proposal wasn’t attractive enough for them. And what happened next is highly interesting for this study. Even if some of the initially contacted national product brands did not accept the invitation to participate in SPA’s outlet concept, they actually helped SPA to develop their new service concepts by presenting a detailed list of questions to be answered by SPA. In this way these national brand owners shared some of their knowledge base with SPA. This was an important contribution that helped SPA to finalise the “PopUp Outlet” concept to be ready for full-scale piloting in co-operation with 6 national product brand owners in July 2014.

5 Conclusions

This explorative study was set up to examine and to shed some light on how service design workshops and tools can be utilised in practice as ‘boundary spanning objects’ while developing new, innovative services within SMEs. In order to provide some answer to this question we first carried out a review of existing literature. Building on Carlile (2002; 2004), Bessant et al. (2005), Bessant and Maher (2009), and Kimbell (2011) we then developed and presented a tentative framework to be used as a tool to analyse the empirical data collected from four new service business cases.

The main conclusion of this paper is that service design – at least when carried out with “low-tech SMEs” (den Hertog et al., 2011) like in this study – is better suited for the development of innovations, that are taking place at the pragmatic boundary (Carlile, 2002) and following the “designing for services” approach (Kimbell, 2001). The aim of the following discussion is to justify our conclusion.

Firstly, even if the use of different service design methods and tools proved to be an efficient way to generate a number of new ideas targeted to improve the quality of service provision and to carry out incremental renewal of service offering, the implementation of these ideas may be difficult in practice. As described on Section 4.1, the design process of promising business cases was discontinued due to different managerial reasons. SPORT’s new “well-being service concept” had problems to gather internal funding for the investments that were necessary to take new ideas to be

piloted in the real-life context. Respectively, REG's business case never entered to the "prototyping" or "piloting" phases due to organizational changes causing the loss of managerial support needed to proceed on with the service design process.

On the contrary, the two other analysed business cases described on Section 4.2 were able to avoid the above mentioned widely referred "innovation traps" (e.g. Hamel; Välikangas, 2003) – even if the innovation related risks were much higher due to novelty and complexity of the service concepts. Indeed, the representatives of both case companies were willing to accept the provocative and radical challenge once they recognized the potential benefits of open, "design for services" (Kimbell, 2011) approach. The first benefit relates on the "platform thinking" (this is the term that we used while presenting and discussing with companies during the "entry phase"). This "platform thinking" seems to enable businesses to carry out iterative experimentations with new, promising service concepts and to get some concrete results fast without loosing the business development. For example, it was already decided even before the implementation of the first full-scale trial (piloting of "PopUp Outlet" service concept) that SPA is ready to start a second round of service design process that is aimed to support the development of the "Arena Service Platform". Secondly, when the ambition level of open platform-typed service design is high enough, it seems to make possible to attract external resources to contribute the content development of new service concepts and, furthermore to share innovation related risks. This was recognized to be highly important for the participated case companies. For example, SPORT was able to apply external funding for their "Sport Camp 2.0" platform development, and national brand owners were willing to share some of their knowledge base with SPA that helped them to take their "PopUp Outlet" service concept to be piloted.

However, it should be noticed that "designing for services" and "platform thinking" requires businesses to span across several mental and organizational boundaries starting with a need to redefine what is "the service" in a particular case. That is why we chose to use the term 'boundary spanning objects' because in our mind, this term illustrates the phenomenon better than the term 'boundary objects'. When reflecting the question "what is the service" in discussions with companies during the "entry phase" (cf. Figure 2), the service was defined "something that you first develop, then you put a price tag on it and start to sell it". So, it was natural that businesses were quite confused when they heard about our suggestions to follow a platform approach. They also had to span their organizational boundaries in a completely new ways as described earlier – SPORT was looking for cooperation with game developers and SPA built up new relations with national product brand owners.

We hope that the findings of this study provided several interesting insights to be studied further in future service innovation and service design research.

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Proposal of a Technology-Assisted Design Methodology for Employee-Driven Innovation

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The role of employees is becoming more important to manage complex service processes and varieties of customer needs in the service industry. To promote employee-driven innovation in service fields, further research on required activities of employees and the technological support for them is necessary. In this paper, the authors propose a technology-assisted design methodology to promote employee-driven innovation based on the literature study. In addition, the authors conducted a case study at an elderly-care facility for its verification.

1 Introduction

The role of employees is becoming more important to manage complex service processes and varieties of customer needs in the service industry. Employees in many of service fields are required to respond to customers and other employees flexibly and autonomously. Their skills and practical knowledge on services are highly important to innovate services.

Employee-driven innovation (EDI) (Høyrup, 2010, Kesting; Ulhøi, 2010) is expected to accelerate the improvement of productivity and quality of services. The role of employees as innovators of their services is gaining attentions not only in the management science but also in other research fields. The design research is one of the research fields which attempt to utilize the capability of employees to innovate services. The common approach of the design research is to clarify the required design activities as methodologies and to support these activities. In addition to the EDI research from the management perspective, the service design approach has a strong potential to provide a means for employees to promote EDI in the service industry. Though the relevance between EDI and service design has been discussed already (Hasu et al., 2011), few studies address the necessity of further studies on service design by employees to promote EDI. Especially, how to support the design activities of employees with information technologies has not been discussed sufficiently. Employees in service fields, especially in small- and medium-sized enterprises are in many cases too busy to reflect their services for innovating them. Their perspectives could be limited in their tasks and that makes it difficult to create affordable and effective ideas for innovation. In addition, innovative ideas tend to be localized in certain units, groups and persons and their potential has not necessarily been maximized. To tackle these issues, the utilization of recent information technologies such as human sensing, behaviour analysis and communication support in employees' design activities could be effective. However, how to integrate these technologies and design activities in an applicable form to service fields has not been established.

In this paper, the authors propose a design methodology assisted by information technologies for employee-driven innovation. The contents of this paper are as follows. In Section 2, the authors explain the result of literature study on employee-driven innovation and service design, and the potential of information technologies to promote EDI. In Section 3, the authors propose a technology-assisted design methodology including its design activities and related technologies. In Section 4, the authors explain a case study of the proposed methodology. In Section 5, the authors discuss the results of the case study, and provide conclusive remarks in Section 6.

2 Literature study

2.1 Employee-driven innovation and service design

First, the authors conducted a literature study of the existing research on employee-driven innovation and service design to clarify their relevance and the required study for service design to promote EDI.

Recently, it has been commonly noticed that the company management is not performed only with the hierarchical and top-down process. Especially for the innovation of services, the role of employees who are familiar with needs of customers and problems in work practice is important. Within this context, employee-driven innovation (Høyrup, 2010; Kesting; Ulhøi, 2010) is gaining attention in service industries. According to Kesting and Ulhøi (2010), EDI is "the generation and implementation of significant new ideas, products and processes originating from a single employee or the joint efforts of two or more employees who are not assigned to this task." Though the research on EDI is rather new, the features and requisites for EDI have been studied through various case studies of business organizations (Rocha, 2010, Teglberg-Lefèvre, 2010). In service industries, healthcare services such as hospitals are common research objects (Telljohann, 2010, Castren; Maijanen, 2013).

EDI can be discussed in relation to the existing theories and methodologies on improving, innovating and designing practices in workplaces. For example, Høyrup pointed out the relevance of EDI to organizational learning or workplace learning (Høyrup, 2010, Høyrup, 2012). Employees attempt to fit their work practices to the confronting service

situations constantly, which is considered as a fundamental learning process for EDI. This process can be considered as an opportunity to improve the employability from the employees' perspective (Høyrup, 2010) and as a source of innovation from the management's perspective. The innovation process by employees can be also explained in comparison with the existing innovation forms such as 'bricolage' that is to manage confronting problems with existing resources at hand and "ad hoc innovation" that refers to a solution to a particular problem posed by a particular client (Fuglsang, 2011, Castren; Maijanen, 2013). To promote EDI, business managers could apply structured approaches such as an incentive system for employees (Teglborg-Lefèvre, 2010) and workshops to gather innovative ideas (Telljohann, 2010). In addition to these mechanisms to promote EDI, some researchers also studied that the personal and cultural aspects of EDI such as the agency of employees toward changing their work practice affect the activities for EDI (Billett, 2012, Brandi; Hasse, 2012). These issues and discussions are closely related to the research on job design (Oldham; Hackman, 2010).

In addition to the aforementioned studies in management science, another trend to innovate services comes from the design research. Service design or the design of services was discussed in the service marketing research also (Shostack, 1984). Meanwhile, recent studies on service design are mainly from the design research. Many of service design studies take human-centered approaches (Stickdorn; Schneider, 2012). The ethnographic study is commonly conducted to understand the stakeholders of target services. As another approach to understand customers, contextual inquiry that is an interview-based field data collection technique (Beyer; Holtzblatt, 1997) is also performed for service design. The empathy for users in design thinking (Brown, 2009) is considered as an important element in service design. In addition, the recent studies on service design rely more on the active participation of employees based on approaches of participatory design (Greenbaum; Kyng, 1991) and co-design (Sanders; Stappers, 2008). Various co-design projects have been conducted especially in healthcare services (Garde; van der Voort, 2013, Sunaga et al., 2014). Furthermore, the autonomous design activities by employees are required to improve the overall productivities of the service industry (Watanabe; Nishimura, 2013).

As can be seen, the concern of service design approaches has become closer to EDI. Meanwhile, there are several differences between these two kinds of studies. Compared to the innovation research from the management perspective, the design research concerns more on its practices to create and realize new ideas from the practitioners' viewpoints. For example, design approaches are more interested in the representation of concepts and ideas. The representation forms are various such as service blueprinting (Shostack, 1984), a miniature of service environments (Garde; van der Voort, 2013) and role-plays named as acting-out (Sunaga, 2009). Through the continuous representation or prototyping, concepts of new services can be evaluated (Stickdorn; Schneider, 2012). In addition to facilitating EDI with management approaches such as incentives and rules, it would be effective to promote EDI by implementing new design activities by employees based on the service design research.

2.2 Why technology-assisted design?

While service design has become closer to the concept of EDI, most of its design activities are still driven by external designers. To make a service design approach employee-driven, its methodological process should be reconsidered.

As has been mentioned, there are two methodological features in service design. One of these features is the understanding of stakeholders and related situations realized by the external observation and analysis. This process should be internalized for an employee-driven design approach. One of the approaches which may replace the external observation is reflection. Reflection is considered as an important process in the existing studies on EDI (Høyrup, 2010, Høyrup, 2012). However, employees' thoughts tend to be limited in their roles and tasks, and it is not necessarily easy for them to understand stakeholders and related situations by reframing their mindsets compared to the design practice by external designers. Further assistance should be considered especially for busy employees.

The other methodological feature of service design is representation. Especially in service design, continuous prototyping (or representation) and evaluation by users are considered as an important process (Stickdorn; Schneider, 2012). How to externalize ideas of employees is rarely discussed in the existing studies on EDI, and this could be an important contribution of the design research to EDI. The externalized design ideas can be used to diffuse design results within the organization. Meanwhile, it is difficult to expect that employees in service fields are good in representation. It is also important how to assist representation by employees in service fields.

In this study, the authors attempt to assist employees' design activities with information technologies. In the existing study on EDI, the methods and tools are considered to take an important role to promote innovative activities by employees (Aasen et al., 2012). There have been several case studies on the application of web-based technologies to collect innovation ideas (Teglborg-Lefèvre, 2010). The research on collective intelligence and Computer-Supported Cooperative Work provides related cases also (Ackerman et al., 2013). However, there have been few studies on further technological assist for EDI except information sharing on innovative ideas. Various technologies to support service design have been developed for example in the field of Service Engineering. Especially, mobile technologies and ubiquitous technologies would be effective to support employees in an ordinary work setting in service fields. These new technologies have a strong potential to enhance the capability of EDI.

2.3 Summary

In this study, the authors suggest how to utilize these information technologies in the service design process as a technology-assisted design methodology. The authors aim at the following goals with this methodology: (1) employee-driven design activities for EDI, (2) technological assistance especially for reflection and representation.

3 Technology-assisted design methodology

3.1 Concept

In this section, the authors explain a technology-assisted design methodology for EDI. Fig. 1 shows the conceptual sketch of the proposed methodology. The authors have suggested a concept of an autonomous and continuous design approach of service processes and systems by the community of employees, named as User-driven Product/Activity Design (UPAD) (Watanabe; Nishimura, 2013). The proposed methodology intends to concretize this design concept.

In this design methodology, a community of employees performs design activities. These activities are supported by business managers and if necessary, outsources such as designers and consultants especially in its start-up process.

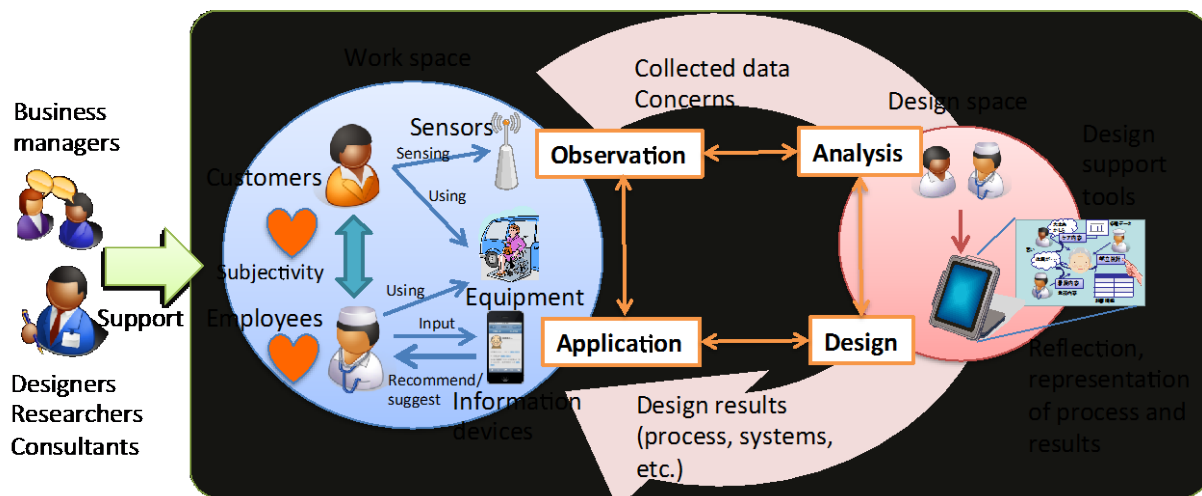


Figure1. Concept sketch of the design methodology.

In this design methodology, the authors define two kinds of spaces as specific situations of employees to be supported with technologies. The first space is “work space.” The work space is an ordinary work setting for employees, and actual service processes and encounters with customers are held in this space. The second space is “design space.” The design space is any kind of situation to reflect and redesign services by employees. It includes not only workshops or formal meetings set for EDI intentionally such as (Teglborg-Lefèvre, 2010, Telljohann, 2010), but also informal meetings or even chats among employees on their specific concerns. These casual occasions in ‘in-line’ activities (Høyrup, 2012) could create new findings and sources of innovation. Design spaces could emerge anytime and anywhere, and it is important to support design activities there.

Related to these spaces, concrete design activities are defined in this methodology. They are described as a design cycle with four phases: observation, analysis, design and application. These phases are determined using the notation of the optimum design loop (AIST, 2008). The optimum design loop was developed as a theoretical process to improve service with a technological approach. The authors convert and concretize this process as a more employee-driven and autonomous design cycle.

3.2 Design phases and support technologies

In this section, the authors explain details of these design phases and required technologies to support design activities in each phase. As Fig. 1 shows, these design phases are not necessarily a one-way process but they could proceed back and forth.

3.2.1 Observation

The understanding of the current status of a service is an important step to redesign it. As has been mentioned, the observation of a service is a common practice in service design. Observation is usually conducted by a third person, but in this methodology, employees themselves mainly observe their own service activities. Therefore, the observation in this methodology means self-observation by employees and mutual observation among employees.

To observe changing situations in a work space is not easy for employees. In addition to the complexity of services, the localized concerns of employees in their own tasks make it difficult to have an overview of their own services (Kesting; Ulhøi, 2010). As technologies to support the observation phase, sensors, observation methods and information devices can be used. In the field of Service Engineering, various methods and tools have been developed to support the observation of services such as a position sensing technology (Makita et al., 2013). Usage logs of systems and tools in work spaces could be utilized also. The obtained data become a source to understand stakeholders and situations in busy daily work. The authors have summarized effective observation and analysis methods by categorizing the patterns of service processes (Watanabe et al., 2013).

Meanwhile, the subjectivity of employees such as concerns, perspectives and feelings affects the performance of services strongly. For the understanding of stakeholders including this subjectivity, the following analysis phase is important.

3.2.2 Analysis

For the deep understanding of services, reflection by employees takes an important role in the research of organizational learning and EDI. The same approach is taken in the analysis phase of the proposed methodology. Design spaces provide opportunities not only to reflect their service practices individually but also to share their perspectives and information to grasp an overview of the current services from multi-dimensional aspects.

For this purpose, the group representation of services is effective. For example, a representation tool to gather employees' perspectives on concerned issues has been proposed (Watanabe et al., 2014). In addition, the observed data could work as potential sources to understand the situations of services. By applying the analytical method to these data, a new viewpoint could be provided for employees in design spaces to indicate a new issue to be discussed. There are also several approaches to analyse and visualize data on service activities. For example, Miwa et al. proposed the statistical and time-series analysis method to visualize the characteristics of service activities (Miwa et al., 2012).

3.2.3 Design

Based on the results of the analysis phase, employees discuss how to change services. The design objects could be service processes, jobs, team arrangement and IT systems used in services. The representation of design objects by employees takes an important role in this design phase also. By representing required situations and how to realize them, employees can concretize their ideas. However, employees in service fields are not necessarily familiar with the representation methods of these design results.

The representation form of the support tool for representation should be flexible enough to represent the employees' mental models (Watanabe et al., 2014). In addition, simple and instant representation is also important for its use by busy employees. By using this kind of tool, representation of concerned issues and design results can be stored. They can be used as a stock of practical knowledge in work spaces.

3.2.4 Application

Represented design results such as new service processes, roles and rules should be disseminated to employees for the application in work spaces. This process has not been discussed sufficiently in the design research and the EDI research. Since the proposed methodology is conducted in an ordinary work setting, the application of its result should be performed with ease by a support of certain technologies.

A communication support system using for example mobile devices can be used for application support. An education system such as an e-learning system would be also a promising technology for this purpose. The applied design results are verified by using newly collected data in work spaces.

4 Case study

4.1 Method

In this paper, the authors introduce a case study related to the proposed methodology.

The field of the case study is an elderly-care facility, Wakoen. Wakoen is a health institute on long-term care for elderly people. The facility contains 3 floors (work spaces) and 150 beds, and approximately 10 employees work on each floor. The authors have been conducting a co-design project with several employees to develop a mobile communication system among employees for an elderly-care service (Watanabe; Nishimura, 2013). In this facility, various kinds of informal information for elderly-care such as requests from a residents' family used to be shared with paper notebooks. This communication system named as DANCE was designed and developed for on-time communication support to replace the notebooks, not for collecting innovative ideas. In addition, this project also aimed at realizing UPAD to promote the employee-driven design activities of service processes and systems used there (Watanabe; Nishimura, 2013). The authors started from the facilitation of a user community which consists of employees. After the continuous prototyping through their active participation, DANCE was deployed and officially used in the facility since Feb. 2014. Approximately 23 devices (iPod touch and iPad) were applied there.

There are two main functions in DANCE (Nishimura et al. 2013). The first function of DANCE is to create and share handover information about care for residents. For the handover of information, texts, photos and voice recording can be used. DANCE can recommend candidates of related message examples based on the stored messages. The name of employees who wrote recommended examples are displayed also to share expertise on communication and care skills. Users of DANCE check messages and search for the handover of a particular person with a few taps by choosing recommended keywords. After checking handover information, users can leave a message as a reply or as additional information with texts and photos. The second function is to check and edit face sheets that are sets of information on each resident. The information in face sheets includes such as dietary, required equipment and how to care for specific occasions. Users can check and modify data on items. They can check the changed history of each item also.

After the deployment of DANCE, the authors conducted the following studies concerning the proposed methodology.

(1) Analysis of the design cycle using DANCE

DANCE is a communication medium to employees and it stores messages sent by them. These messages can be used to understand service situations in the observation phase according to the proposed methodology. In addition, DANCE contains several functions for representation such as the photo function. It would be meaningful to investigate how these functions were used in design activities also.

To confirm how DANCE was used in relation to the proposed design methodology, the authors conducted the following studies. First, the authors conducted semi-structured interviews to a manager and four members who participated in the design of DANCE about the changes of service practices after the system deployment. In addition, the authors analysed how the photo function was used in the elderly-care facility. The data of DANCE used for the analysis were from May 1st to June 11th, 2014. Through these studies, the authors attempted to confirm how employees performed design activities in the design phases and how DANCE was utilized for these purposes.

(2) Workshop based on the analysis of DANCE data

DANCE does not contain the analysis method of obtained data. Therefore, it is difficult to obtain findings on the analysis phase through the aforementioned studies. To clarify the influence of analysis of observed data, the authors conducted a workshop with several employees. In this workshop, the authors showed the results of the co-occurrence network analysis. The co-occurrence network analysis is to figure out frequently used words and their relations and to represent them in a graph form. After seeing this result, the employees reflected their work based on it and redesigned it.

4.2 Result

The result of the case study is shown as follows.

(1) Analysis of the design cycle using DANCE

In the interviews, the following topics were mentioned.

- Utilization of photos for communication

One of the most significant changes after the deployment of DANCE was the utilization of photos for communication. Some of the employees used to add drawings on how to care for certain residents on the notebook. By using the photo function of DANCE, employees were able to understand the situation and to explain how to help eating and how to support the posture of a certain resident more easily.

- Timings to check handover information

The shift from a notebook to a mobile device changes the timings to check handover information. Nurses and physical therapists who work at several work spaces mentioned that it had become easier to check the situations in each work space in advance. They could not bring their devices with them during work usually because of the limited number of the devices, but in comparison to the notebooks which used to be located in each work space, employees were able to check the situations more frequently.

- Awareness of employees who have not read information

Another influence of the deployment of DANCE was that employees who have not read messages were clarified with the read/unread display in the system. How to let all of them read messages had become an issue to be solved for them.

- Sign of issues to be discussed

The interviewees cared the messages sent frequently on the similar contents or on the same resident. This could be a kind of indicator to aware an issue to be discussed in design spaces.

According to the interview results, it was clarified that the photo function was used for design and application of service activities. From the analysis of photos in DANCE, the following usages were observed.

(2) Workshop based on the analysis of DANCE data

The participants of the workshop focused on major words in the co-occurrence network: ‘visit,’ ‘husband,’ ‘eat’ and “without notice.” These keywords reminded them of messages sent frequently on this resident such as “the husband helped eating without noticing care workers.” This resident related to Fig. 2 had difficulty in swallowing and needed assistance in eating by care staff. However, her husband helped her eating without noticing care staff. This could raise the risk to cause incidents.

The graph shows a network of Japanese words. Nodes are colored yellow or teal. Edges are solid or dashed lines. Some edges are labeled with English text: 'Husband', 'Without notice', 'Eat', and 'Visit'.

- Yellow Nodes:** 差し入れ (Sashiire), 持つ (Motsu), 夫 (Uchi), 食べる (Taberu), 面会 (Menkai), 前 (Mae), 食堂 (Shokudang), 入れる (Irueru), 黙る (Damaru).
- Teal Nodes:** 先生 (Sensei), OK, 職員 (Shokunin), 姿勢 (Seishi), 本日 (Konjitsu).

Key connections and labels:

- Husband:** Connects 夫 (Uchi) and 先生 (Sensei).
- Without notice:** Connects 夫 (Uchi) and 職員 (Shokunin).
- Eat:** Connects 食べる (Taberu) and 面会 (Menkai).
- Visit:** Connects 面会 (Menkai) and 面会 (Menkai).

5 Discussion

According to the results of the case study, the authors discuss how the proposed methodology and the related technologies could work in service fields.

According to the interviews, the handover information had become shared more fluently with DANCE according to the interview result on the easier access to the information. The visual communication using photos and drawings was used not only for communication but also for design and application of service activities such as how to set a pillow or how to take a resident to the bathroom. These activities by employees can be considered as bricolage (Fuglsang, 2011). In addition, it was clarified that using photos is effective as a means for those who are not accustomed to visual representation. By using DANCE, the representation of redesigned service activities had become easier, and more importantly, the representation result can be immediately sent to every employee though it requires more efforts to have all the employees utilize it.

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analysis of photos. From the interview result, the frequent messages on the same issue could be the sign to notice the issues to be discussed. This point could be discussed from the workshop result as follows.

(2) Workshop based on the analysis of DANCE data

In the workshop, the co-occurrence network analysis was able to visualize the issues to be discussed, and the extracted keywords were able to remind employees the problems on services. This could be an empirical result on the effectiveness of technological analysis to reflect service practices. In this case study, the authors performed co-occurrence network analysis instead of employees, but this process could be automated by clarifying the effective conditions to visualize issues.

In addition, the effective design result for the resident, family and employees was obtained in this workshop. By discussing among different roles of employees, effective ideas were generated. Though employees have already conducted the autonomous design cycle in this facility, further studies on how to create these design spaces using support technologies are required.

5.2 Future works

In this case study, the authors used only DANCE as a data source for observation and analysis. Meanwhile, there could be various observation and analysis approaches. Further studies are required on the influence of use of other kinds of technologies like sensing devices. In this case study, the application of DANCE is the replacement of the existing media, so there were few adverse effects. But especially when the technologies to collect new data from the service field, its range of application and access to these data should be designed adequately. One of the most important points is that the application of these technologies is determined based on the autonomy of employees. Otherwise, it is difficult to make any kind of approach toward EDI success. The empirical findings from the EDI research on the influence of personalities and organizational culture would be helpful to consider how to implement design approaches for employees successfully.

In this case study, employees represented and utilized design results, but its process was not represented. This decision process in design spaces is important especially when they need to modify or repeal rules. This issue is being studied by using other representation methods such as (Watanabe et al., 2014).

For the verification of the proposed methodology, further case studies are required. The proposed methodology should be evaluated in other kind of service fields, also.

6 Conclusion

In this paper, the authors explored how EDI could be conducted and supported with the design approach. To concretize the EDI process as a design approach, the authors first conducted the literature study on EDI and service design. Based on its result, the authors proposed a technology-assisted design methodology to promote EDI. This methodology includes design activities in the four phases of the design cycle: observation, analysis, design and application, and required technologies for each phase. For the verification of the proposed methodology, the authors conducted a case study at the elderly-care facility where the authors conducted a co-design project to develop the communication system for employees named as DANCE. Through the interviews and the analysis of the data of DANCE, the authors clarified that employees actually conducted design activities in the design phases, especially observation, design and application. In addition, the communication and representation functions of DANCE applied in the service field promoted the employee-driven design activities. The authors confirmed that the analysis of obtained data in DANCE could trigger the reflection of employees in the workshop with them. In the future works, the authors would conduct more case studies with other kinds of technologies to improve the productivity of service industries.

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Building a Service Productivity Lab: Simulation-based Modelling and Analysis of Service Processes and related Performance Data

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The term “service productivity” leads more often to confusion than providing deeper meaning to business and service managers. Service productivity is often perceived as abstract concept and is not linked to resource management, service controlling or business performance management. Presented research aims at developing a SME-oriented service productivity measurement model for industrial services. Conceptual design of our solution approach is presented and relevant solutions concepts are described. The conceptualization of the PROMIDIS service productivity lab, which is currently being developed by a consortium of research partners and companies, is presented. The conceptual frame is developed and research streams are explained. The service productivity lab stimulates learning processes between industry and science. It provides insights into service-based business models operations at build time. In this way designers and practitioners can explore at build time implications on service processes and data requirements concerning supporting ICT systems and infrastructure.

1 Introduction

In manufacturing-oriented and goods-oriented industries the productivity concept is common and widely spread amongst management functions (Jones, 1988, Parasuraman, 2002, 2010). Especially the production and operation field uses productivity concepts to manage its operations (Johnston, Jones, 2004). This research intends to draw from existing research contributions and results. Available approaches are reviewed and synthesized to a software engineering-oriented (Balzert, 2008, pp. 451; Oestereich, 2008, pp. 89) solution design for given application domain. Analysis and design activities (Oestereich 2008, pp. 122 (use case, operations), pp. 134 (vocabulary), pp. 201 (define attributes (class diagrams))) presented are primarily led by software engineering techniques (e.g. object-oriented modelling through UML-models).

In focus of this research are product-related and industrial services rendered through small and medium-sized enterprises (SME). Measuring and improving service productivity in a SME environment (Gebauer et al., 2010) needs a service strategy as prerequisite. All kinds of data can be collected and measured based on existing information systems and performance measurement systems, but remains without meaning or links only in limited way to productivity of service operations. Thus managing and measuring service productivity requires the review and evaluation of existing systems. Target group of this research are SME which typically interact closely with larger corporations either as mere service suppliers (e.g. product-related services (Weiß et al., 2011, Husen, 2007, pp.21; Koch, 2010; FSO, 2011), industrial services) or provider of product-related services supporting the usage of the physical products delivered. Typically, in a product-related context besides core services, enabling and enhancing services are packaged to service offerings (Grönroos, 2007, pp. 187, pp.199). Business processes are an attractive target for productivity measures. Services are produced and consumed as processes. Hence, the process perspective can be seen as imperative because constituting a major characteristic of services (Grönroos, 2007, p. 52). From this understanding “services are processes consisting of activities or a series of activities” (Grönroos, 2007, p. 53).

The remainder of the paper is structured as follows. Firstly, service productivity is overlooked and major concepts and dimensions of a measurement model are briefly reviewed and elicited. Resulting list of design concepts provides a good check list for the later review and evaluation of existing monitoring and measurement systems. In this way gaps can be identified and recommendations for concrete measures can be made. Identified productivity concepts are then further concretized and substantiated. Especially a link to existing performance measurement systems as prevailing in industry is made. In a next step implementation steps of the conceptualized measurement system are outlined. Finally the paper summarizes yielded results and draws final conclusions as well as offering prospects about next steps to be taken and future research tasks and challenges.

2 Objectives

Subsequently, it will be argued that traditional productivity measurements are not responding to specific requirements of industrial services. Hence new ways and approaches are required which have to be based on traditional measurement systems.

Presented research aims at developing a service productivity measurement model for industrial services and elaborates especially on its strategic implications for SMEs (Gebauer et al., 2010, Kowalkowski, 2010). Conceptual design of our solution approach is presented and relevant solutions concepts are described. Today, industry still lacks appropriate systems and techniques to measure, design and manage service productivity. Most companies are lacking an appropriate service strategy which however is mandatory to decide on what should be measured. Often internal

efficiency measures (cost reduction) following traditional techniques from manufacturing and operations management dominate in a real industrial context. In consequence, industrial services are not seen as holistic strategic concept but as complementary element of a company's offering.

Based on our use case analysis it is assumed that in reality, different maturity levels of service suppliers concerning productivity management can be determined. Some companies are still working on the level of low sophisticated approaches such as document-based procedures (based on office software such as Excel, Access, etc.). Others are operating more sophisticated software infrastructures and IT systems such as ERP, CRM, SCM, procurement systems (Weiß et al., 2011), or business intelligence (BI). Possible scenario can be simulated through modifying design parameters (such as order volumes, idle times, efforts, quality, utilization, costs, etc.). The paper argues how simulation experiments within the productivity lab can be used to gain insights about real life systems at build time. Subsequently architecture and simulation environment are presented as major deliverables including technical concepts (Coloured Petri Nets (CPN) (Jensen, Kristensen, 2009)), Business Process Modeling Notation (BPMN) (Weske, 2007), etc.). Based on conceptualization solution design is supported independently from technologies, platforms, systems or software solutions.

Finally, development of productivity cockpits are designed and developed based on gained insights from run simulation experiments. They can be either based on simple Excel sheets or on full-fledged business intelligence software packages. In the context of SME light-weight solutions and packages are preferred. Agile methods, user-centric design and applications can be seen as crucial success factor for implementing projects. Considering productivity measures and indicators at design time is challenging. The proposed productivity lab integrates referred approaches and fields. Presented dimensions span the solution space. Business process simulation (BPS) can be used to support business process benchmarking and furthermore BPS can be seen as a part of business process improvement (BPI) (Aalst, Stahl, Westergaard, 2013), (Aalst, Stahl, 2011), (Jensen, Kristensen, 2009).

3 Service Productivity

Manufacturers in many industries seek service-led growth beyond their product core. More and more capital goods manufacturing companies (Gebauer et al., 2010) and product-based companies (goods-oriented) strive "to increase their competitiveness by moving towards a service-based business model" (Kindström, 2010). Service research and studies underline that industry is undergoing a substantial change and transformation from mere "transaction-oriented" to more "relational" business interactions (e.g. Vargo and Lusch, 2004, 2011; Grönroos, 2007, pp. 30-43; pp.90-102; pp.145-164). Producer of goods will develop towards operators and solution providers facilitated through the products and services of the own enterprise or combined, joint offerings with business partners. This can be explained with a paradigm shift away from mere "seller-buyer" transactions to "co-creation" and value-in-use paradigms. Multitude of contributions exists (Grönroos, 2007, Teboul, 2006) mainly in the field of service management and marketing and an emerging contribution into the interdisciplinary research field called "service science". Concepts often referred to in this context are "service-dominant-logic" (Vargo, Lusch, 2004, 2006; Kowalkowski, 2010), "co-creation" (Vargo and Lusch, 2006), "product-service-systems" or "value-in-use".

3.1 Related Work

Table 1 overviews the results which yielded from our literature review. The table refers to identified approaches which are seen as most influential and appropriate for our research activities. The list is not perceived to be exclusive and listed scholars are rather chosen to represent common approaches to measure service productivity.

This section will not strive for a deeper understanding what is perceived as service businesses, but will repeat and explain some of the essence. Subsequent section aims at the further conceptualization of our measurement approach.

Table 1. Literature Review: Overview of Productivity Approaches and Models.

Author(s)	Productivity Approach and Concepts
Grönroos, Ojasalo (2004)	Service productivity as blend of functional variables: internal efficiency (cost), external efficiency (revenue) and capacity efficiency (demand). Productivity model illustrating three kind of production and consumption processes.
Johnston, Jones (2004)	System-oriented conceptualization of service productivity: Identification of three major subsystems to be looked at: customer productivity, operational productivity and interaction-induced productivity.
Grönroos (2007)	Service encounter and relationship quality, influence of interactive marketing. Service productivity model, measures and metrics. Process-related productivity measurement.

Author(s)	Productivity Approach and Concepts
Parasuraman (2002)	Conceptual framework for understanding the interplay between service quality and productivity. Service quality and boosting service productivity are in conflict. Differentiation of customer and company perspective (inputs and outputs to service process).
Jones (1988)	Model of service operations comprising three stages: productivity, capacity management, quality management. Inputs and intermediate outputs are described. Model differentiates between services and manufactured goods on the basis of time, place, and control of the production.
Vargo, Lusch (2004)	Distinguish the logic of the goods- and service centered views looking at primary unit of exchange, role of goods, role of customers, determination and meaning of value, firm-customer interaction, source of economic growth.

Service businesses (Grönroos, 2007, pp. 30; Husen, 2007, pp. 20, Koch, 2010, pp.8, FSO, 2011, Konradin, 2014, Gebauer et al., 2010) comprehend products or results no longer as mere results or output of the manufacturer's production process but as input among others into the customer's value generating process. Produced physical products or outputs are thus resources consumed by the customer to generate revenue or to create value for its own customers. Transforming a manufacturing business into a service business requires "servicizing" (Grönroos, 2007, pp. 444) all elements in customer relationships.

Industrial services encompass all kinds of product-related or supportive services such as industrial maintenance, repair, inspection or renewal services. Industrial services combine technical materials such spare parts, tools with immaterial elements (service-related activities). Husen (2007) sees product-related services accordingly as additional services for the primary product (tangible) and the value created through rendering these services to customers. Typically, product-related services augment the existing offering and support the usage and/or after sales phase of physical products. Examples for excellent product-related services which augment physical product offerings are rendered through Hilti (Hilti, 2014).

3.2 Service Productivity Model

The service productivity model forms one constituent element of presented solution design. Subsequently, pivotal concepts of service productivity measurement are reviewed. Productivity can be seen as an umbrella concept for various ratios such as utilization, efficiency, effectiveness, quality, etc.

Traditional manufacturing-oriented productivity concepts need to be evaluated and partially expanded to fulfil specific requirements for measuring service productivity. Understanding the essence of service operations is a prerequisite for the design of effective measurement tools and solutions. In literature various dimensions are proposed to aggregate (firm or department) or disaggregate (product, service process) service productivity into smaller building blocks and different contexts (e.g. in Jones, 1988, Parasuraman, 2002, Calabrese, 2012).

Service productivity is a complex concept (Jones, 1988, Parasuraman, 2010, Backhaus et al., 2010, Grönroos and Ojasalo, 2004, Johnston and Jones, 2004, Grönroos, 2007) and has been subject to various research initiatives and projects. Interdisciplinary research approaches are required to fully approach and understand service productivity. Many articles and contributions from various research streams have been produced during last years, so that the intention is not to be too repetitive and to discuss all relevant aspects once again. In the following it is rather aimed at summarizing the substrate of available service productivity measures and models (Table 2). It is looked at why traditional or manufacturing-oriented productivity concepts or measures typically fail or lead to unpleasant results in a services context.

Table 2. Impact of Service Productivity Measures: Measurement Concepts.

No.	Concept	Decision area
1	Profitability	Profit, costs, revenues, customer lifetime profit, retention costs, relationship costs (direct, indirect, psychological), production costs, long-term/ short-term sacrifice, customer relationship profitability, internal (cost) efficiency
2	Service quality	Service strategy fit / accuracy, service recovery process, complaints process, non-facturable services quality, customer contacts, repurchasing, cross-selling, retention, customer satisfaction, perceived service quality, value perception, SERVQUAL-determinants/indicators (tangibles, reliability, responsiveness, assurance, empathy), technical / functional quality, design quality, relationship quality

No.	Concept	Decision area
3	Customer	Customer loyalty, customer process, customer perceived value, personal experiences, segments, preferences, usage, behaviour, profile, customer lifecycle, relationship quality, complaints, order history, trust, commitment, benefits (revenue, cost), investment, customer value, volumes, profitability potential, maturity (learning / stage), external (revenue) efficiency
4	Capacity/ demand	Distribution function, arrival rates, customer share, peak times, empowerment, multi-skilling, demand forecast accuracy, customer participation rate / degree, capacity (demand) efficiency
5	Resources	Human resources / employees, physical products / resources (machines, facilities, materials, technology), systems, knowledge, internal relations, availability, service-mindedness, appearance, accessibility
6	Service process	Relationship performance (satisfaction / quality/ value / sacrifice), episode performance (satisfaction / quality / value / sacrifice), zone of tolerance, activity, idle time, resource utilization, waiting time, processing time, throughput time, arrival time, rejection rate, incidents, quality gaps, comparison standards
7	Service offering	Accessibility, interactions, communication, customer participation, core / enabling / enhancing services (and goods), perceived service value (per feature), value quantification of total service offering (total offering benefits)
8	Service encounter	Servicescape, physical dimensions, internal response, performance, spatial context, social and physical interactions, behaviour (customer, employee, systems)
9	Relationship	Customer retention rate, customer relationship quality, customer base, segments, interactions, relationship costs, sacrifice / investments
10	Image / brand	Perceived servicescape, expectations, experience, incidents (activity, episode, relationship), sign, symbols, artifacts, behaviour, social interactions, ambient conditions, brand contacts, communication messages (planned / unplanned), product / service messages, word of mouth, identity, quality gaps
11	Marketing	Promise, expectations, interactive marketing, internal marketing, customer lifecycle, external marketing (marketing P's), direct contacts / messages (initial stage, purchasing process, consumption (usage) process), external marketing fit, employee retention and satisfaction, service culture, internal behaviour, customer orientation, part-time marketers (competences / training / qualification)

In summary Figure 1 illustrates the conceptualization of the service productivity as UML class diagram. It can be as well perceived as information model. Relationships between discussed concepts have been further analysed.

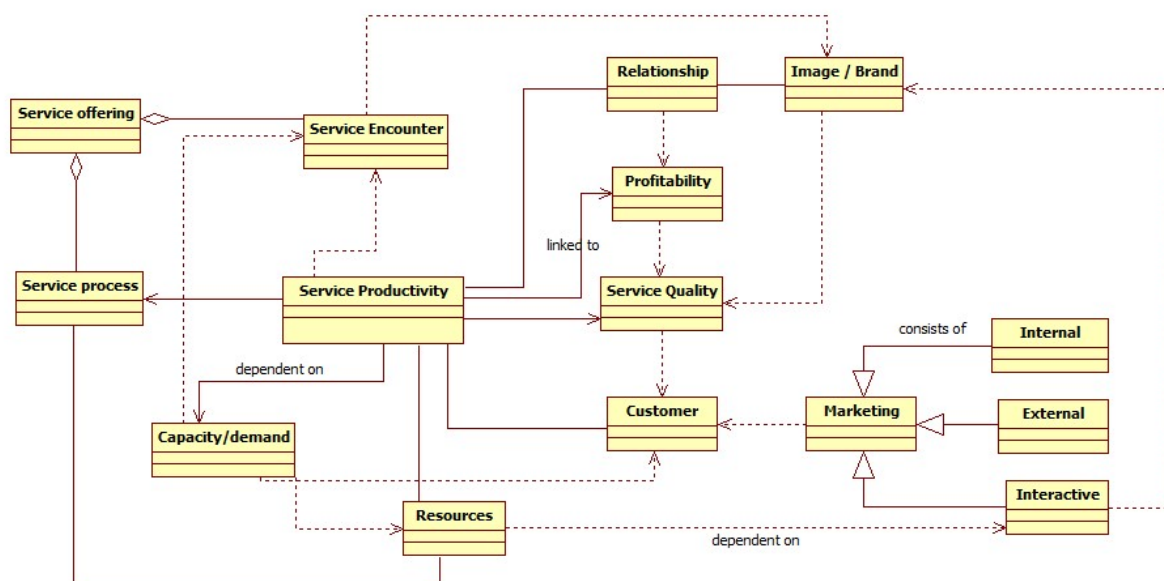


Figure 1. Service Productivity Conceptualization.

As our aim is to develop a software demonstrator software engineering (Oestereich, 2009, pp. 122, Balzert, 2008, pp. 451) techniques and processes are applied. UML (Unified Modeling Language) allows to identify information objects (Oestereich, 2009, pp. 201) which provides the basis for further steps. To give an example, shown class such as “Customer” needs to be further broken down into subclasses through applying generalization and specialization principles. In this way links between requirements (e.g. productivity model dimension) and implementable concepts can be made. Identified relationships and dependencies between the distinct system elements are represented as relationship types. Analysing dependencies and relationships between design elements provides a starting point for later cause-effect analysis and conception of productivity measurements and cockpits. Displayed productivity concepts are respectively mapped to KPI, goals and metrics of performance measurement systems.

3.3 Indicators and Metrics

As already referred to in Table 1 Grönroos and Ojasolo (2004) argue to measure service productivity as function of the variables cost efficiency (internal), revenue efficiency (external) and capacity efficiency (demand, utilization) (Grönroos, Ojasolo, 2004), (Grönroos 2007, p. 255).

As a global productivity measure service productivity measure total revenues in relation to total costs are proposed. In this proposal, “service productivity equals more or less profitability [...] or the economic result of a service operation (Grönroos, 2007, p. 255). In summary, measuring service productivity first of all requires a deeper understanding of service productivity concept and service operations (see as well Johnston and Jones, 2004).

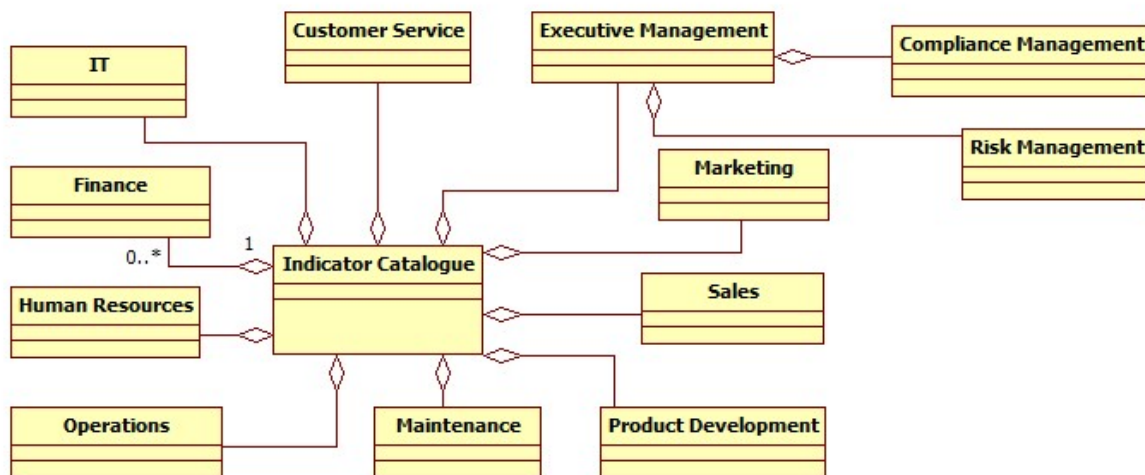


Figure 2. Indicator Library / Catalogue: Information Model (based on Mosimann et al., 2007, further developed).

Quality, productivity and profitability are strongly intertwined and can hardly be separated (Grönroos, 2007, pp. 252, Parasuraman, 2002, Hogreve, 2011). The influence of quality and cost functions on revenue function is seen of importance and is argued to be the core of any service productivity measurement. Often, traditional manufacturing-oriented measures are applied in service operations, what leads to negative or counteracting effects.

Various different measures and indicators can be derived and applied. Effective productivity measurement has to build on both partial and total productivity measures which represent preceding views and factors related to the service productivity concept. Once the services productivity model is designed indicators can be chosen from the indicator library (Figure 2) to specify factors and variables which constitute the measurement model.

Various approaches are available in scientific literature proposing concrete dimensions on which appropriate measurements should be based. Process-based measurement relates mainly to the dimensions proposed by Johnston and Jones (2004) and Grönroos and Ojasolo (2004). The latter argues that on the highest aggregation level only financial measures, namely revenues-cost-ratio, and profitability, are to be considered. In service, productivity and profitability merge. Service productivity can be defined as function of the variables internal (cost efficiency), external (effectiveness or revenue efficiency) and capacity (demand efficiency or utilization) efficiency (Grönroos, Ojasolo, 2004):

$$f(\text{internal efficiency, external efficiency, capacity efficiency})$$

According to this perspective, productivity measurement needs to be seen as a blend of the three variables. Johnston and Jones (2004) argue to distinguish an operational and customer perspective to capture service productivity. In this way, inputs and resources brought into the transformation process through the customer are taken into account. A possible classification of service productivity measures is illustrated in Figure . Hartigh and Zegveld (2011) propose total factor productivity (TFP) as appropriate measure based on customer value (output) divided by employee and capital inputs.

Distinguishing between partial and total productivity measures appears to be most appropriate as it allows to link to respective hierarchies (modules) as applied in executable simulation and business process models.

Table 3 summarizes a proposal of Ojasalo (1999) which can be found in Grönroos (2007, p. 255) how service productivity can be approached by differentiating between physical, financial measures and/or by a combination of both.

Table 3. Service Productivity Measures (Ojasalo, 1999 in Grönroos, 2007, p.255).

	Physical measures	Financial measures	Combined measures
Partial productivity (output/one input)	e.g. $\frac{\text{customer served}}{\text{employee hours}}$	e.g. $\frac{\text{revenues}}{\text{labour costs}}$	e.g. $\frac{\text{revenues}}{\text{number of employees}}$
Total productivity	e.g. $\frac{\text{customer served}}{\text{total resources}}$	e.g. $\frac{\text{revenues}}{\text{cost of resources}}$	e.g. $\frac{\text{revenues}}{\text{level of resources}}$

A sound analysis of service operations necessitates selecting appropriate indicators based on partial productivity measures. Total productivity measures should address merely service quality and profitability (Grönroos and Ojasalo, 2004), (Johnston, Jones, 2004). In real practice, plenty of performance measures and indicators are available (Mosimann et al., 2007, Kimball and Ross, 2013). The prioritisation and selection of indicators and measures which show significant influence on service operations and processes can be seen as major challenge. Grönroos (2007) provides a good start and makes concrete suggestions how measures and indicators are interrelated as well how they can be prioritized in a measurement approach (Grönroos, 2007, p. 253).

The service productivity model has been already addressed extensively during previous sections. Next business process modelling will be further addressed and explained. The link and its potential contribution to service productivity measurement will be discussed. In subsequent sections performance measurement and the indicator system as core an implementation tasks are looked into. Then the interrelationships and relevance with regard to previously introduced concepts will be highlighted and explained.

3.4 Service Process Modeling

A detailed analysis of the business processes starts with reference process modeling in order to realize mayor differences and discrepancies of process instances of selected use cases. Use cases hence are an appropriate starting point of the process analysis (Oestereich, 2009, pp. 122), because complexity of analysis can be reduced through clarifying what should be regarded as part of the analysis and what can be seen as located outside the frame of analysis. In this way, partial productivity analysis can be carried out without the risk to overload the analysis activity with too many indicators and metrics.

The reference process model (Figure 3) defines typical collaborative interfaces between contractors and ordering parties (eBusInstand, 2011, Weiß et al., 2011). The reference process yielded from a detailed analysis of use cases. Business processes were analysed, media breaks were marked and scrutinized, redundant activities like repeated manual input of business data in company's IT-system were identified.

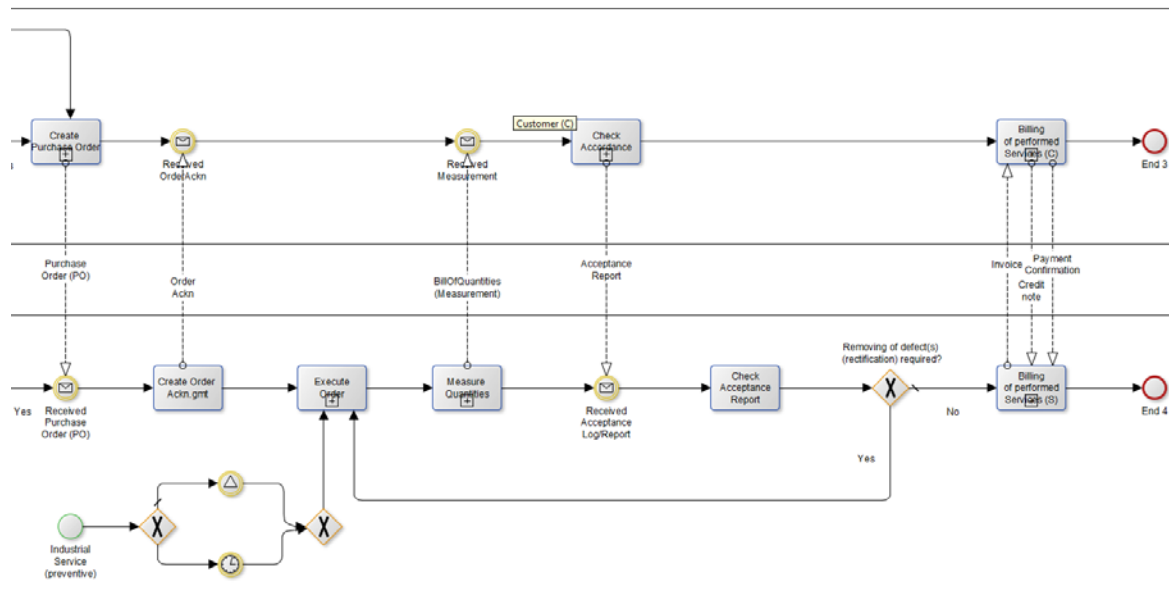


Figure 3. Service Reference Process Modeling.

Next level of analysis takes focus on business documents which refers to a outcome-oriented perspective (see Figure 4). Analysis of business documents (business objects) aims at better understanding of information flows in the industrial service network. Existing interfaces yield additional information concerning the nature of interactions between customer and supplier as well between supplier and its subcontractors or partners. The interfaces are connecting the various underlying IT-systems. Hence information and data flows were analysed in depth.

Both internal and company-wide processes were assessed to measure processing time of transactions and processes, total cycle time for processing service orders and required amount of man-hours and days. Finally, the results of analysis of realized measurement leads to re-engineering of value or business processes which need to be accompanied by an appropriate change management to achieve required sustainability (Herfurth, Schuster, Weiß, 2013, Weiß et al., 2011).

Following a service strategy puts the customer process more and more in focus. Thus collaborative modelling of business processes is appealing to analyse the nature of interactions between customer and supplier. In this way, interactions are systematically understood and the supplier is able to lower costs of “being a customer”. Furthermore collaborative modelling allows studying the customer process in greater detail and reflects the need to see that what is delivered to the customer as input to the customer revenue creating processes.

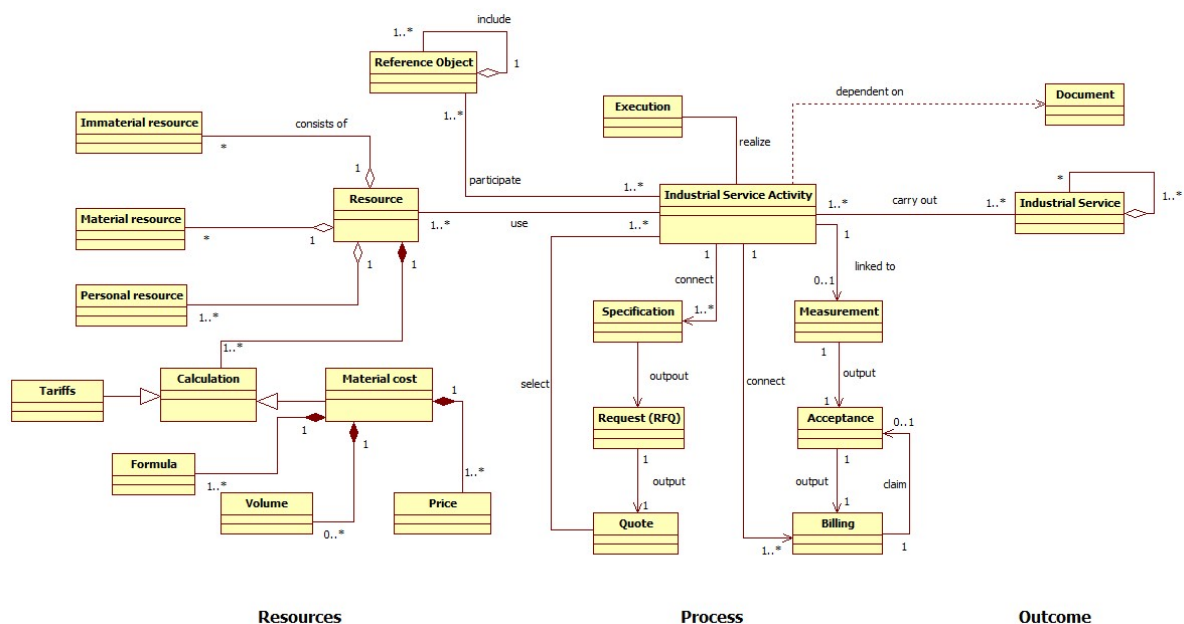


Figure 4. Industrial Service: Resource Model.

Interactions with customer yield to insights into how the value and revenue generating capabilities of a customer can be leveraged. Understanding the customer processes and what the customer intends and actually does with the offering is important.

3.5 Resource Model

Service productivity measurements relate to respective resource models. Process-based measurements describe process resources in a separate resource model (Figure 4). Resource models (see e.g. Grönroos, 2007, pp. 374, van der Aalst, van Hees, 2002, pp. 78) are the basis for capacity planning and to analyse capacity requirements of service processes.

Especially simulation-based analysis can develop a better understanding how resources are used by the various process activities. Three dimensions are distinguished: resources, process and outcome. Simulation experiments (van der Aalst et al., 2013, Jensen and Kristensen, 2009, pp. 273, van der Aalst, Stahl, 2011, pp. 287) can highlight process-based performance indicators such as average processing time, average completion time, average waiting time, throughput time, average number of cases handled, as well as providing insights concerning resulting effects of service strategies and reconfiguration of service encounters.

3.6 Simulation-based Analysis

Simulation aims at creating executable models (such as Colored Petri Nets (CPN)) (Jensen, Kristensen, 2009; Aalst, Stahl, 2011) which represent system behaviour and interactions between system elements in correspondence with systems behaviour in reality. Often modelling is used to reason or plan systems. However, simulation offers further insights and deeper understanding of systems behaviour. Experiments are run to explore and understand how the system needs to be designed to fulfil respective requirements. Our objective is to use this technique in order to design and improve service processes. Consumed and used resources by service processes are monitored. Furthermore, it is aimed at measuring service productivity which is a complex concept composed of various dimensions and variables. Subsequently, a simulation environment called simulation lab is developed. First step requires identifying constituting elements as fundamental building blocks. These concepts are transferred into implementable concepts.

The simulation approach reveals possible improvements and indicates the potential future effectiveness of service processes. Measured performance indicators (e.g. processing and throughput time) of inspected service processes support the results of our simulation-based analysis. Yielding deliverable is an indicator catalogue. While theoretical contributions concerning service productivity are manifold and exhaustive, the implementation of solutions tailored to the needs of enterprises is still challenging. Especially, small and medium-sized enterprises (SME) require solutions, which are flexible and tailored to their needs (Weiß et al., 2011). For this, the paper proposes a productivity measurement model linked with selected indicators (taken from the indicator catalogue) (Figure 2).

The challenge is to take on board individual needs and requirements while not neglecting the need to cohere to industrial standards. Simulation-based modelling and analysis supports co-creating services processes together with customers and business partners at an early stage of development. In this way, negative side effects are prevented and expectations aligned. Cost savings through less corrections thus preventing later re-engineering are argued.

The aim was to model the regarded service processes (taken from selected use cases) as close to reality as possible. In an iterative and incremental process additional information and details were added complementing the model step by step together with users. Regular process talks, workshops and consultation of users are a pivotal element of this way of analysis.

Service processes are modelled using business process representation language BPMN (Business Process Modeling Notation) (as shown in Figure 3) (Weske, 2007, pp. 205–225, Havey, 2005, pp. 143). Modeling software and tools based on BPMN are addressing simulation and typically offer rudimentary to advanced simulation capabilities. However, these tools are either expensive or are only covering some basic partly advanced functionalities (e.g. Tibco Business Suite).

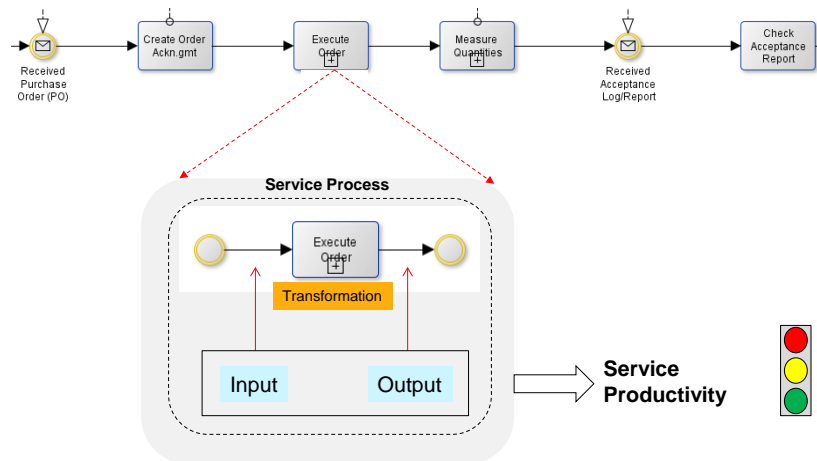


Figure 5. Process-based Productivity Measurement.

Often simulation-based modelling requires adhering to some specific modelling conventions, such as using places are not allowed or only some specific control flow nodes and patterns are supported by the simulation engine. Nevertheless, after some practicing and studying of respective modelling conventions, simulation is well supported (Jensen and Kristensen, 2009, pp. 273, van der Aalst, Stahl, 2011, pp. 293). Distribution functions determine probabilities of control nodes and number of tokens in the system. However, only standard performance indicators such as throughput time, idle time, waiting time, utilization etc. are automatically applied and displayed in standardised simulation reports. In this way, capacity efficiency can be analysed and the behaviour of the system can be studied using simple experiments.

Simulation conventions and modelling is not BPMN-specific which means that using a different software tool requires adaptations of existing models to reflect diverging modelling conventions and concepts. Hence, BPMN-based modelling software and tools try to overcome this shortcoming by translating BPMN-models into BPEL (Business Process Execution Language). BPEL is in general interpretable through workflow engines (Havey, 2005, pp. 143, pp. 103).

In summary, BPMN constitutes in an industrial context a powerful mean, as it represents a modelling language or representation which is broadly accepted and known in industrial settings. Introducing new representations and language requires efforts and it is not granted that these efforts might yield fruitful results. Based on the authors experience formal modelling techniques or unknown modelling languages to the users provoke resistance and necessitate considerable change management efforts. As a consequence communication between involved actors gets limited and distracted. Valuable information and knowledge will be hence not accessible or lost as users neglect to contribute only in a limited way if at all to respective processes and project tasks.

Another limitation refers to the fact that modelling of cases or tokens is not or only partially supported. This means that so called business objects can be modelled as data structures or models, but cannot be distinguished in the simulation models by their properties. Techniques as prioritization, time stamps, or complex token structures (such as compounds of data elements, or tuples (Cartesian products)) are not or only rudimentarily supported (van der Aalst et al., 2013).

4 Simulation-based Modelling

Colored petri nets (CPN) (Jensen, Kristensen, 2009, van der Aalst, Stahl, 2011, pp. –169–204) offer free sophisticated tools and required formal foundations to set up an simulation lab environment (van der Aalst et al., 2013). Furthermore, the organizational view supports to allocate resources and roles to single service activities. Performance indicators can be aggregated or disaggregated in relation to the hierarchical structure of the process model. Resources can be adequately described, configured and analyzed (Jensen, Kristensen, 2009, pp. 95–125, van der Aalst; Stahl, 2010, p. 281-299).

Presented approach foresees to extract business process models from selected use cases. Industrial services provide the application context. As a result business process models are modeled in BPMN notation as high level analysis (Havey, 2005, pp. 145). According to Havey (2005) BPMN develops its strength “as a graphical flowchart-like language intended for use by business analysts and developers to build business process diagrams” (Havey, 2005, p. 145). A reference business process model eases the modeling task, as it contributes the overall control flow and business logic. In this way, business vocabulary as well as a list business objects (documents) are already defined and available. Together with the industrial partners, business process models are adapted and described in further detail. For this purpose hierarchical modeling is applied.

Transforming business process models (represented in BPMN) into executable models requires first of all the mapping of modeling artefacts and concepts. As already described a top-down approach is followed. Empirical data is gathered during this phase and is used to set up simulation experiments (van der Aalst et al., 2013). For this purpose, more formalized notations (such as coloured petri net) are needed which allow to specify control flow conditions

(transition (guards) and arc inscriptions) as well as place types (business objects and data types) (van der Aalst, Stahl, 2011, pp. 171).

In first step simple simulation experiments are conducted to estimate process cost, resource utilization, idle times, processing times per task, project phase and in total. Next step in planning and preparing of simulation experiments requires constructing appropriate simulation models. Modelling formalism and tools need to support this task. Decisions have to be made concerning which simulation environment and software should be used and in best way support desired outcome. Simulation modelling encompasses analysing respective control flows and resources consumed or used by the service process. Service processes can be very complex, thus views are applied to reduce complexity by focusing on specific modelling aspects such as control flow, functions, data, process hierarchy, organisation and time, etc.

A multitude of different software and tools exists which propose various ways and approaches how business processes best can be modelled. Typically such software tools cover previously mentioned views and concepts. Typically, communities of practice have emerged and have built considerable knowledge and best practices around these modelling software and tools. In this way, plenty of design patterns and solution designs are available for most of the typically occurring problems in systems and business process modelling as well as for the development of simulation experiments. However not all software tools support the design of executable models.

Executable models require formalisms and sound mathematical foundations which often lead to kind of disconnect and distraction of users and modellers in a modelling project. Thus, formalisms are best kept in the back office and are not applied at front stage interacting with end users and stakeholders. Starting point of modelling projects are hence use cases which are best selected together with the various stakeholders and respective end users. Criteria for classifying and selecting uses cases are volume, frequency, relevance, impact, importance (strategic and operational), improvement potential, complexity, etc.

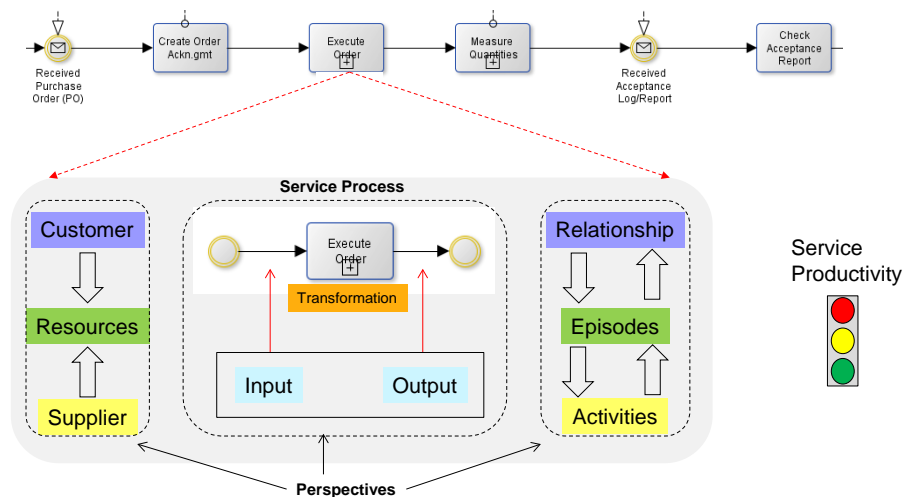


Figure 6. Service Productivity Modeling: Constructing Simulation Models.

In a first step, only standard performance indicators are used such as time, capacity (typically simple counters linked to places or transitions). One strength of CPN tools is that they can be used free of charge. Modelling conventions are as well proprietary; however, applied concepts here are CPN-specific and are generally portable and not tool-specific. This overcomes one limitation of BPMN-based tools.

Subsequently, Coloured Petri Nets (CPN) are not introduced in further detail (interested readers are referred to (Jensen and Kristensen, 2009, van der Aalst et al., 2013, van der Aalst, 2011, pp. 169–247). At this conceptual design stage it is sufficient to outline their potential contribution to create formal and expressive simulation environment. For our research on simulation models in the context of service productivity measurement, CPN offers an appropriate simulation environment. They will be used to construct simulation models and run detailed analysis on basis of this representation.

Finally, in the last section a brief overview and introduction to information and data analysis and visualization is provided. Data visualization tools serve as major user interface and support decision-making processes in real practice (design and run time).

5 Analysis and Visualisation

Controlling tools for measuring service productivity need to consider process-based and performance based indicators.

Business Intelligence (Kimball and Ross, 2013, Garcia and Harmsen, 2012) considers aspects of visualisation of service performance. Service performance will be monitored and visualised by productivity management cockpits. Business Process Management as further component considers and analysis possible service processes, management and modelling tools, which can be recommended and are applicable for a holistic service productivity model. Furthermore, Performance Measurement System as third component supports companies to select appropriate

performance indicators (van der Aalst et al., 2013, van der Aalst, Stahl, 2011, pp. 287). In this way individual solutions can be realized based on modules from a shared service productivity reference framework. Indicators are selected according to user preferences and given application scenario.

Classification of operational, financial and customer indicators supports to choose best possible indicators from the catalogue of indicators (Figure 2). The design of data visualization software needs to reflect besides the applied service productivity model concepts as well strategic elements such as addressed by Balanced Scorecard designs. It defines applied measurement logic. Basis of the Service Productivity Model are the above mentioned four components and their content. To build process-oriented service productivity models key elements and concepts such as delivered through the Balanced Scorecard have to be added and considered if relevant. BSC constitutes one interesting avenue to design and develop our controlling tools measuring and monitoring service productivity. Results of simulation experiments have to be as well integrated in our solution design. Controlling tools need to support process-related analysis and results of simulation experiments need to be visualised to the users.

The industrial service productivity model determines at that level the possible range of operational measures and requirements which are necessary to enhance service productivity. Core aspects are here an exact definition of company aims as well as the redefinition and adaption of new objectives. Second stage contains the above mentioned importance of sub classification of indicators in key performance indicators.

With the support of the indicator catalogue (Figure 2) it is now easier to determine the relevant key performance indicators and to evaluate measure and describe courses of action. Key outcomes of that stage are the differentiation and systematization of performance criteria and target fields and an identification of key performance indicators for characterizing and ascertainment of input and output effects on the different service processes. Third stage considers with support of the Balanced Scorecard significant requirements of the company strategy which can be used for a holistic management strategy to increase service productivity. Central research questions of that stage will include questions about the service productivity strategy of the company, criteria and objectives of the balanced Scorecard and direct links or related effects which can be expected between possible objectives. Visualization and data analysis can be realized based on data warehouse solutions as well as business intelligence software solutions and tools (Kimball and Ross, 2013).

Besides Open Source tools which are attractive for the targeted domain of SMEs, commercial software as Qlikview (Garcia and Harmsen, 2012) with its associative query technology offers an attractive solution concept for SMEs. Software tools implementing productivity measurement have to be created on top of existing infrastructure and software. As respective ETL-processes are flexible and data integration interfaces are adaptable, it is possible to create individual productivity measurement solutions for nearly every application domain and context.

Furthermore, concepts as the Balanced Scorecard can be used to point out relevant key performance indicators and to align operational and strategic perspectives. BSC supports in best way strategy orientated aims and to decide on appropriate measures as well as to define measurable goals and indicators to continuously monitor achievements. Solution design requires to answer questions concerning reporting and analysis. BI design typically follows a DAR approach (dashboard, analysis, reporting) which addresses all required functionality for a productivity cockpit.

6 Summary and Conclusions

Presented research aimed at developing a SME-oriented service productivity measurement model for industrial services. Conceptual design of our solution approach was presented and relevant solutions concepts were described.

Today, industry still lacks appropriate systems and techniques to measure, design and manage service productivity. Most commonly, service productivity is perceived as being complex and is not associated by service and business managers with related measurement concepts of implemented performance measurement systems. Most severely, if service productivity is measured and monitored without aligning company's strategy and marketing activities to follow the service logic, in the long term initiatives to leverage service productivity will probably fail. Often traditional techniques from manufacturing and operations management dominate available solution concepts. In consequence, deeper understanding of service operations and its imperative on company's operations and offerings need to be explored and need to be understood by decision makers.

First step of developing a service productivity model will be the identification of relevant elements or components, which are mandatory for measuring and evaluating service productivity. Given application domain is industrial services. We presented a first solution design based on a conceptual model, which includes relevant components for designing, monitoring and improving service productivity. A systematic approach is presented aiming at classifying performance indicators for service operations. Solutions concepts need to be linked to existing monitoring and controlling tools. However, redesign of measurement models might be mandatory to align company's operations and revenue generation to the service logic. Next step of our research foresees to concretize the measurement approach and to implement discussed service productivity concepts in a SME application context. Use cases will allow us to evaluate presented conceptualization of the solution approach. Design elements will flow into software demonstrators. Furthermore, simulation-based modelling and analysis will be further elaborated. Based on presented business processes executable process models will be created. Simulation experiments will be further looked into in order to demonstrate added value for SMEs to support decision making at design time.

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The political embeddedness of public service innovation driven by networked ubiquitous technologies: the case of 3rd generation public bike sharing schemes in Sweden and China

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One driver of the recent innovations in public services is the advancement of networked ubiquitous technologies, which significantly lowered the marginal cost of public services that previously were too costly or impossible to provide (Gardner et al.,2007). Political actors from the public sectors are usually involved during the process due to its public good character. By using the case of 3rd generation public bike sharing schemes in Sweden and China, this paper shows that political embeddedness might be one of the impact factors to diverge the business models even when the technologies are almost identical. The political embeddedness is not the only factor that has influences on the business models of public service innovation driven by networked ubiquitous technologies, but its role has been so far neglected in social innovation literatures. This paper argues that the political embeddedness perspective is an important variable to understand the holistic picture especially when it comes to the cases from a country where the market economy is not mature. The comparison between the public bike sharing schemes in Gothenburg Sweden and Hangzhou China shows that the difference in political embeddedness lies in the existence of semi-public authority and the state-owned companies as actors. And such difference has impacted the choice of the operator, the ownership structure, financing method and the policy design in the business model.

Key words: Public service innovation, social innovation, political embeddedness, networked ubiquitous technologies

Introduction

This paper discusses the influence of political embeddedness of public service on business model formation during the social innovation process driven by networked ubiquitous technologies. Social innovation in service research has gained increasing interests as many innovations in public services are providing "public goods" or semi "public goods" in the fields where one would assume innovation deficits in the pure market economy situation (Pol and Ville, 2009; Pol et al.,2007). The rise of social innovation and the adoption of new technologies are two driving forces to turn such deficits into the Promised Land for innovators.

Social innovation per se is a process of creating new solutions for the "public good" (Centre for Social Innovation, 2008), which differentiates it from the pure business innovation. Many business innovations do contribute to the society in a positive way as a result but that is not mandatory in the primary purpose. Social innovation often requires a sustainable business model that is either profit or non-profit, but to seek solutions for societal challenges are of the primary vision. The difference at the starting point might cause distinctions on its innovation process, especially in the public service domain where due to its public good character; political actors from the public sectors are more or less involved in developing these types of new services. The formation of the business model is a crucial part of diffusion and scaling up during the social innovation process. Therefore to understand the political embeddedness of developing public services is contributing to the holistic understanding of social innovation process.

The business models of social innovation vary in countless forms under different contexts. This paper is not aiming to generalize a model for all, but to raise the attention of studies on the influence of political embeddedness to the business model formation in public services by discussing a specific case, which has the technology and the political embeddedness contexts. The case shows that for implementing the same type of technology, the business model is different, and the different types of political embeddedness is one of those influencing factors.

On the technology context, one driver of the recent innovations in public services (such as eHealth and eGovernance) is the advancement of networked ubiquitous technologies, which significantly lowered the marginal cost of public services or goods that previously were too costly to provide (Gardner et al.,2007). On the other hand, networked ubiquitous technologies are driving the rise of shared economy or collaborative economy that promotes more efficient uses of resources among people; therefore many of these applications are contributing to tackle society challenges. This paper uses one of the most widely spread networked technology applications in the world - the 3rd generation public bike sharing scheme as a comparative case study.

Public bike sharing is neither a new idea, nor a new practice. Prior attempts could not sustain and scaled up as the systems were not efficient enough to balance the costs on operation in large scale. According to DeMaio's interview to

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Schimmelpennick (DeMaio, 2009), the 1st generation could be traced back to the July of 1965 in Amsterdam, where ordinary bikes painted in white for public usage. People were free to borrow a bike and leave it for the next user when they reached the destination. There were no fees, no tracking of usage and no stations. The project collapsed in just a few days with many bikes ended up in canals or being stolen. Since early 1990s, the 2nd generation public bike sharing projects have emerged in Denmark, first with a small scale at Farsø, Grenå and Naksø (26 bikes and 4 stations), and then a big installation in Copenhagen (Nielse, 1993). The 2nd generation was improved by setting up stations with a coin deposit system at the city center and specially designed bikes for intensive usage as well as advertising spaces. The system was operated by a non-profit organization. However due to the anonymity of users, it experienced thefts. The 3rd generation public bike sharing scheme is Information and Communication Technology (ICT) enabled, self-service, short-term, one-way-capable bike rental offer in public spaces, for several target groups, with network characteristics (OBIS, 2011). It is smartened with a variety of technologies such as electronically-locking racks, telecommunication systems, smartcards and mobile phone access, and on-board computers (DeMaio, 2009). All of these new features that are driven by networked technologies made it possible to operate at a large scale with a manageable cost. Velo'v in Lyon is not the first but perhaps the first one that made it noticeable. It is operated by outdoor advertising company JCDecaux with 1500 bikes. In 2007 Paris took the idea and made a huge success. The scheme is called Vélib', starting from 7000 bikes and expanded to 23,600 in central and suburbs. Since then the 3rd generation took off and disseminated rapidly around the world (Optimising Bike Sharing in European Cities, 2009). By April 2013, there were estimated 535 schemes with 517,000 bicycles worldwide, in 49 countries (Larsen, 2013).

This paper chooses two of them: The Hangzhou scheme in China and the Gothenburg Scheme in Sweden. These two schemes represent the common business models respectively in China and Sweden with different types of political embeddedness. The technologies that are adopted are almost of no fundamental difference but the business models differ.

This paper is structured as follows. After the introduction, section 1 frames the theories and concepts that are related to the empirical discussion. Section 2 discusses the methods and data collection. Section 3 describes the different business models of the 3rd generation public bike sharing schemes in Gothenburg and Hangzhou, while Section 4 discusses the influence of political embeddedness from such comparison. This paper ends with a reflective remark.

1 Theoretical framework

1.1 The social innovation process and the business model

Business model is to capture the value of innovation (Chesbrough and Rosenbloom, 2002) so that it can be diffused, scaled up and sustained. The process of social innovation often follows four stages: 1) idea generating by understanding the social needs and identifying potential solutions; 2) Prototyping and piloting ideas; 3) assessing, scaling up and diffusing good ideas; 4) learning and evolving (Mulgan, 2006). A good business model is crucial for the good ideas or good solutions to diffuse, and a sustainable business model requires continuous learning and evolving. The social innovation process is distinguished from pure business innovation process by starting with understanding the social needs and identifying solutions. As such distinction lies much on the definition and characters of social innovation, it is necessary to investigate from its definition.

There is little doubt on why the society shall not opt for social innovation, but its concept varies at the meanings and in practice. However it is not impossible to find some common ground. In general it can be understood as new solutions to meet social goals (Mulgan, 2006; Mulgan et al., 2007). The Young Foundation defined it as "*innovation activities and services that are motivated by the goal of meeting a social need and that are predominantly developed and diffused through organizations whose primary purpose is social.*" In this more narrowed version, the character of "social purpose" is emphasized. European Commission launched a guide book for social innovation in 2013, which raised the attention on its systematic character as social innovation creates "new social relationships or collaboration" (European Commission, 2013:6). Pol and Ville (2009) reviewed its concepts from various sources and organizations and categorized those into 4 groups. One is as mentioned earlier that is related to social purposes that is linked to improve the quality of life. The second has an emphasis on the "public good" that is related to system-changing. The third one attempts to draw a line between social innovation and business innovation, which defines social innovation as needs ignored on the market (Forum on Social Innovation, 2000). The other concept is proposed by Heiscale (2007) which links to institutional change in cultural, normative and regulative structures. Pol and Ville (2009) argued that the importance of the "practice" character of social innovation by concluding that "the term social innovation is of great importance when its empirical meaning is distilled". Moreover they also argued that government has a role to play in a subset of social innovation (they defined it as pure social innovation) because "the free market economy will not produce the socially optimal amount of pure social innovations".

Therefore the concept of social innovation in public services is often characterized by some sort of social purposes, with a systematic and practices in its nature and with the involvement of the government. These three characters indicate that the business model of such practice is: 1) led by a certain social purpose as the primary driving force; 2) context-specific due to the systematic and practice nature; 3) involved with multiple actors from public and private sectors. For public service innovation where public goods or semi-public goods are supposed to deliver, there is a role

of the government to play when the market itself will not produce the socially optimal amount of pure social innovations.

1.2 The political embeddedness of social innovation in public services

The public-private partnership is perhaps common to use in public service research. However in this case, the scheme from China involves state-owned companies and semi-public authorities, where the boundaries of the public and private isn't that clear as the Chinese economy is undergoing the transformation from a former communist planning economy to a market economy. Therefore the political embeddedness perspective suits better to discuss the case.

The term political embeddedness is used in international business research and management research, which means "a specific form of social embeddedness characterized by a mix of formal and informal ties with political agents" (Granovetter, 1985; Grabher and Stark, 1997 in Krug, 2012). It often refers the connections to the government or state-owned resources, as well as the influence on policies (Okhmatovskiy, 2010). In the contemporary Chinese context, empirical studies show the general pattern of close relationships between firms and the state, where political embeddedness "turns local government agencies into market players, as they are directly involved in market transactions instead of being the representatives and executors of formal institutions" (Krug, 2012). Not only in the Chinese market, the involvement of the government and public authorities in developing public services is self-evident due to its public goods character. There might be different types of how it is involved in the roles and responsibilities, ownership structures, financing methods, contracting, policy making and many other related aspects which are influencing the formation of business models for social innovation in public services. The influences are not necessarily always positive, and the political embeddedness perspective provides a way to look at both sides.

In this paper, the political embeddedness is reflected in the actors who are public authorities, state-owned companies or semi-public authorities, and their roles and responsibilities in implementing the 3rd generation public bike sharing schemes.

1.3 The business model of 3rd generation public bike sharing scheme as social innovation

The 3rd generation public bike sharing scheme can be understood as a semi-public services social innovation driven by networked ubiquitous technologies, which is provided by the collaboration of the public and private actors, or actors who are semi-public.

The 3rd generation public bike sharing scheme in Gothenburg-- Styr&Ställ was initiated by the municipality and is the second largest bike sharing scheme in Sweden. First inception in Aug.2010, it has gained increasing popularity among the users during the last three years. In 2011 it generated 180,500 trips, and the number has been more than doubled in year 2013 with a total rental of 420,500 times and 24,640 seasonal registered users (Trafikkontoret Göteborgs Stad, 2013:5). So far, the system has total 1000 bikes and 60 stations that are distributed in the city center. According to the operation manager Stefan Lind, the number of daily rental in 2013 is 2,500 times and the daily rental per bike is 2.5 times.

The city of Hangzhou runs the country's first 3rd generation public bike sharing scheme and is also the second largest one. Influenced by the successful story of bike sharing scheme in Lyon and Paris, the municipal government of Hangzhou decided to introduce the 3rd generation bike sharing scheme to its citizens in 2008. The same year in May the first pilot of 61 stations with 2,800 bikes were launched and got immediate positive response from the citizens and tourists. By June 2013 the system has expanded to 69,700 bikes and 3000 stations, covering the major districts of city centre and tourist destinations within; the average daily rental reached 257,600 and number of daily rental per bike was 3.7 times (Hangzhou Bike Sharing, 2012). The aim is to expand further to 800,000 bikes (Liu, 2014).

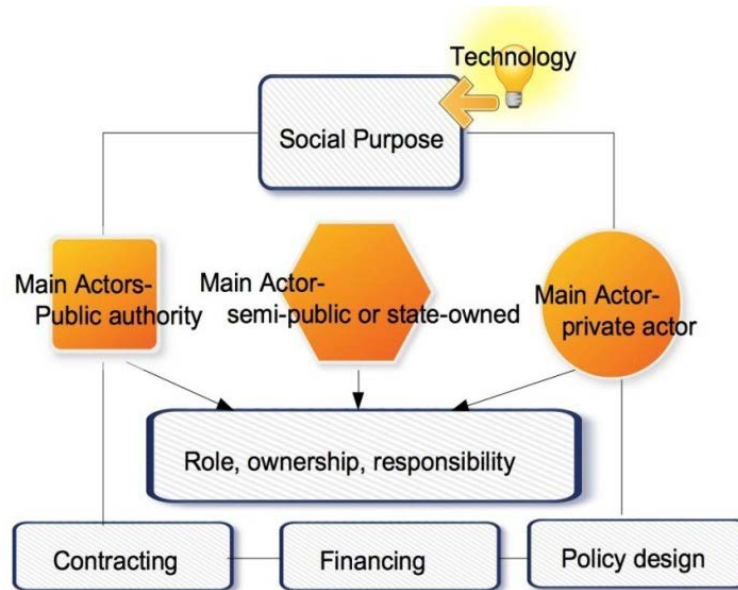


Figure 1. the analytical framework of business model for 3rd generation public bike sharing schemes.

A business model usually consists of actors and their roles and responsibilities, their relations to each other (in this case it is the operation and contract), ownership and financing. Due to the characters of social innovation, the social purpose shall be included in the business model. Another aspect to add is the policy perspective. Therefore the analytical framework of the business model of the 3rd generation public bike sharing scheme is defined as in 5 parts: the social purpose, the main actors and their ownership responsibilities, financing, contracting, as well as the policy design.

2 Data collection and method

This paper uses qualitative case studies as the method. The first hand data is collected mainly from interviews and field trips. The interview questions are designed in to semi-structured in order to gather more inputs from the interviewees. The second hand data are from related documents, media clips and leaflets.

Field trips and interviews have been done during March and April 2014 in Hangzhou China and Gothenburg Sweden. The details are summarized in Table 1. Interviews were 45 minutes to 1 hour in length. The design of interview questions adopts the scheme framework provided by Optimising Bike Sharing in European Cities A Handbook (OBIS, 2011). The interview questions were structured in 4 parts: 1) the aims and objectives of the scheme. 2) The physical and technology of the scheme. 3) The business model of the scheme (who are involved, what are the roles and responsibilities of each actor and how each actor works with each other). 4) The policy designs (if any on the city, regional and national level) for the scheme. Discussions from Parts 1, 3, 4 are analyzed in the next section, while the information on the physical design and technology (part 2) is operated as a control factor (confirm that the technology parts are of no fundamental differences).

Table 1. Interviews (face to face interviews).

Name	Title	Organization	Org. Type	Time
Chaoyong Liu	Deputy general manager	Hangzhou Bike Sharing, China	State-owned	14-03-04
Yuhang Cao	Deputy general manager	Bicycle service Jiaying, China	State-owned	14-03-07
Liqiang Zhang	General manager	GST (green smart traffic) tech, China	Joint-stock	14-03-10
Lei Shi	Executive vice president	WASU Group, China	State-owned	14-03-14
Stefan Lind	Operational manager	Jedecaux, Sweden	Private company	14-04-10
Jonas Åker	Project manager	Urban Transport Administration, Gothenburg Sweden	Public Authority	14-04-16

3 Empirical discussions of the business models

3.1 The social purpose of the 3rd generation public bike sharing scheme

Generally speaking all 3rd generation public bike sharing schemes are contributing to the environmental sustainability as it promotes the usage of riding bikes (Åker, 2014; Liu, 2014). And as a semi-public goods type of services with very

low rental fees, it contributes to the overall welfare of the citizens and users. Despite these two social purposes, two cities do have differences on the more specific social purpose from the public authorities' point of view.

In the city of Gothenburg, it is to enhance the picture of the city as a bike friendly city. Gothenburg has a well-established bike culture, and so far the scheme is not aimed to replace the private bikes, nor to compete with other public transportation methods such as buses, trams, boats, trains or car polls, but as a complementary choice to enhance the popularity of the public transportation system as a whole and to make it more sustainable (Åker, 2014).

In Hangzhou the scheme is positioned (and it is similar in other cities of China) as a "min shen gong chen" meaning projects designed to improve the lives of citizens (Liu, 2014; Cao, 2014; Zhang, 2014; Shi, 2014). One way to explain this position is due to China's Confucius cultural and conventions, the government considered itself to have a "parental" role to take care of its people; therefore the public bike sharing scheme is one of these projects that making such efforts visible. Consequently it is legitimized to subsidize the project without any referendum among citizens.

Other benefits are ranging from increasing the cycling modal share, as an additional mobility option, to increase attractiveness for tourists, to make the cycling more visible and positive city image to when the whole public transportation system becomes more popular, it might reduce the usage of passenger cars, and hence reduce the carbon emissions (Åker, 2014; Liu, 2014; Zhang, 2014; Cao, 2014). However, the urban area in the city of Hangzhou is much bigger than that in the city of Gothenburg (16.5 times bigger), and the public transportation facilities and density in central city areas are less developed than Gothenburg, therefore to manage public transport demand is an important motive for Hangzhou (such as congestion avoidance and last/first mile problem) but not for Gothenburg. But these differences are not caused by political embeddedness.

3.2 Actors, Ownership, responsibility

Gothenburg

In Gothenburg case, the Municipal government (Public Authority) is the initiator and host, Urban Transport Administration (Public Authority) is executing the project, while the installation, operation and maintenance are by the private outdoor advertising company Jcdecaux. The whole system including physical infrastructures and all data gathered from the docks and users' accounts are owned by Jcdecaux; Municipality owns the brand name "Styr & Ställ" (Åker, 2014; Lind, 2014).

The Urban Transport Administration monitors and evaluates the services, jointly with other public departments to plan the land use of stations. The operator is responsible to build, operate and maintain the system and all services (Åker, 2014).

Hangzhou

The Municipal government (Public Authority) is the initiator and host; Hangzhou public transport group (solely state-owned liability limited company, a semi-public authority) is executing the project. Hangzhou public transport group set up solely-owned subsidiary Hangzhou bike sharing (State-owned company) to operate (Liu, 2014); to make the business sustainable, it then set up joint-stock company GST Tech (joint-state-owned) to export the system to other cities in China as an extra source of income (Zhang, 2014). During the contracting period, the operator is the owner of the whole system including the physical infrastructures and all data gathered from the docks and users' accounts (Liu, 2014).

Public authority plans, monitors, evaluates and contract. The operator is responsible to build, operate and maintain the system and all services (Liu, 2014).

3.3 Financing

Gothenburg

The municipality uses advertising spaces as an exchange for the services so it does not directly subsidize it. The operator balances the account by incomes from the advertising and a small part from bike users' payments (Åker, 2014; Lind, 2014).

Hangzhou

The initial investment (infrastructure and all the physical investment) is from government subsidies, and the aim is to maintain the business self-sufficient for long run. Apart from the direct subsidies, the operator balances the finance from advertising, by users' payment, and by exporting the system to other cities (Liu, 2014).

3.4 Contract

Gothenburg

Beroud and Anaya (2012) defined this type of institutional arrangement as private intervention of public services. The whole system is installed, operated and maintained by private multinational outdoor advertising company Jcdecaux according to tjänste concession (service concession, Procurement Directive 2004²⁵⁷). According to the statistics of a summary of 51 schemes in Europe, outdoor advertising companies Jcdecaux and ClearChannel are the top two operators (OBIS, 2011:26).

The municipality offers outdoor advertising spaces to Jcdecaux as an exchange for construction, operation, maintenance and services of the scheme during the contract period (with possibility to extend, Åker, 2014).

Hangzhou

The whole project is constructed, operated and maintained by Hangzhou Bike Sharing, which was founded in 2008 to implement the city's public bike sharing scheme by state-owned company Hangzhou transportation group, as a solely-owned subsidiary. To make the business sustainable, the group then set up joint-stock company GST Tech to export the system to other cities in China as an extra source of income (Liu, 2014; Zhang, 2014).

Explicitly, general rules of national public procurement regulation are applied but the municipal government has more flexibility on how to implement it. Some provincial or city authority publishes directive documents to regulate and guide the implementation of the public biking sharing schemes. Hangzhou municipal government has such guidance (Liu, 2014).

Implicitly, the common method is mainly called Zhengfu goumai fuwu, which means government buys services (Liu, 2014; Zhang, 2014). Literally the translation doesn't help to understand what it means. The meaning of it can be reflected better in its principle "shi chang hua yun zuo, gong yi xing fu wu" (market operation for non-profit, welfare public services). Therefore the author concludes such method as "Commercial operation of public welfare services".

3.5 Policy design

In both China and Sweden, there is no national level policy concerning public bike sharing scheme, but on the municipality level, both have defined the primary objective and benefits, both have evaluations, and both have regular meetings in the beginning to coordinate the planning and construction of the stations. On municipality level, both DON'T have regular communication platform for all stakeholders (Liu, 2014; Åker, 2014).

The difference on policy design is mainly on municipality level. Hangzhou has launched its own policy to regulate the implementation of the scheme, which integrated the public bike sharing scheme into the municipal public transportation system.

4 A summary of the business models and its relation to political embeddedness

Table 2 summaries the major findings in the business models of 3rd generation public bike sharing schemes in Gothenburg (the private intervention of public services) and Hangzhou (the commercial operation of public welfare services).

²⁵⁷ Service concession is the supplier provides services of general economic interest e.g. energy, water and waste disposal. Article 17 of the Procurement Directive, refers to the definition of service concession in Article 1(4): 'Service concession' is a contract of the same type as a public service contract except for the fact that the consideration for the provision of services consists either solely in the right to exploit the service or in this right together with payment (Directive 2004/18/EC).

Table 2. A summary of the business models.

	Gothenburg: private intervention of public services	Hangzhou: Commercial operation of public welfare services
Social Purposes	Sustainability and welfare	Sustainability and welfare
Actor-Initiator and host	Municipal government	Municipal government
Actor- Execution	Urban Transport Administration (Public Authority)	Hangzhou public transport group (solely state-owned liability limited company-semi-public authority)
Actor- Operator	By outdoor advertising company Jcdecaux (private actor).	Hangzhou public transport group set up solely-owned subsidiary HZ bike sharing company to operate the project; to make the business sustainable, it then set up joint-stock company GST Tech to export the system to other cities in China as an extra source of income
Contract	The municipality offers outdoor advertising spaces to Jcdecaux as an exchange for construction, operation, maintenance and services of the scheme during the contract period (with possibility to extend).	Zhengfu goumai fuwu
Ownership of the facility and data	Jcdecaux owns all except the brand name (The municipality owns the name)	HZ bike sharing company during the contracting period, but as it is also state-owned, theoretically all citizens have the ownership
Responsibilities	Public authority- plan, monitor and evaluate and contract; Jcdecaux- to build and operate and maintain	Public authority- finance, plan, guide and evaluate and to create the operator; Operator- to build and operate and maintain
Financing	Advertising, by users' payment	Government Subsidies, Advertising, by users' payment, exporting the system to other cities
Policy design	No specific policies	launched its own policy to regulate the implementation of the scheme, which integrated the public bike sharing scheme into the municipal public transportation system

The difference in political embeddedness of this comparison lies in the existence of semi-public authority actors and the state-owned companies as actors in the Hangzhou case. And such difference has impacted the choice of the operator, the ownership structure, financing method and the policy design. Hangzhou public transport group is a state-owned enterprise and a semi-public authority, and this special in-between role enables it to create its own operator, yet another state-owned company: the Hangzhou bike sharing company. Under such structure, the public authority has more control over the operators not only by contracting power but the hierarchy power. While in the Gothenburg case, the public authority only has the contracting power, which leads to less control over the operator. Secondly it made possible for the creation of a semi- state owned company GST Tech to export the system to other cities in China as an extra source of income, which adds on the innovation in the business model and increases the diffusion of innovation. While in the Gothenburg case, such role is carried by the private actor. Thirdly the Hangzhou Public Transport Group is responsible for the planning and management of the city's public transportation system, it made less barrier to incorporate the bike scheme to the entire public transportation system. While in the Gothenburg case, such integration has been difficult (for instance the bike scheme has not yet been able to integrate to the planning of Västtrafik's public transportation system). As different city may have different operators, it could be a barrier for future integration of public bike sharing schemes on a regional level. The involvement of the semi-public or semi-market actors on the other hand creates confusions. The definition of responsibility, power and ownership is not very clear among involved companies in the Hangzhou case. Gothenburg one has a more clear contract to regulate the power and responsibilities of the host government and the operators.

The strong involvement of the semi-public authority and state-owned actors is a result of the country's transformation from centralized planning economy toward a market economy. The business model "Commercial operation of public welfare services" indicates the path of such transformation. Beyond that, the paternalistic Confucius values approach and the authoritarian convention are facilitating the strong role of the government in economic activities. As a result, this makes it easier to finance the public bike sharing scheme in China especially in the initial

phase and for large size of schemes by government subsidies. In the Gothenburg case, there is no investment from the tax money. The negative side is of course the Hangzhou government thus shares more financial risks.

5 Reflective remarks

The political embeddedness is not the only factor that has influences on the business models of public service innovation driven by networked ubiquitous technologies, but its role has been so far neglected in social innovation literatures. The case studies of the 3rd generation public bike sharing schemes in Hangzhou and Gothenburg illustrates the influence of different types of political embeddedness on the business model formation of public service during the social innovation process for implementing the same type of technology. In this case, it impacts the choice of operator, sources of financing, ownership and policy design of the scheme. Although the findings are limited as case specific, it shed lights on raising the attention of studies on the influence of political embeddedness to the business model formation in social innovation process, especially when one intends to analyze cases from a country where the market economy is not mature. The other aspect is related to the networked ubiquitous technologies and the ownership of data generated from its applications. As shown from the cases, the ownership theoretically belongs to the operator, but there is a lack of further clarification on its usage and in both cases there are lack of specific regulations and rules for the operators and other actors to follow. This issue might not be case specific but a general one for most of the public service innovations driven by networked ubiquitous technologies, and it requires further study.

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